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REFUSE COLLECTION AND DISPOSAL. AN ANNOTATED BIBLIOGRAPHY, 1962-1963

Ralph J. Black, et al

National Center for Urban and Industrial Health
Chevy Chase, Maryland

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REFUSE COLLECTION AND DISPOSAL

An Annotated Bibliography 1962-1963

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PREFACE

This 1962–63 Supplement is arranged in sections corresponding to the various administrative and operational phases of the broad field of solid waste management. The usefulness of this Supplement has been increased by the addition of a subject index with many cross-references, and the notation of the type of article after each entry. The latter is explained on the following page. As in previous Supplements, the references are annotated, periodicals and other publications cited are listed, and a geographical index is included.

The following abbreviations are used in the brackets [ ] following the annotations to give the reader a better idea of the format of the item:

Detailed	det.
Diagram(s)	diag.
Drawing(s)	dr.
Extract(s)	ext.
General	gen.
Graph(s)	gr.
Illustration(s) (photograph(s))	ill.
Map(s)	map
News	news
Page(s)	p. (pp.)
References listed	ref.
Table(s)	tab.
Technical	tech.

A. REGULATIONS (including Laws and Ordinances)

Anonymous

1. CITY LAW REQUIRES LOCKED CONTAINERS. *Refuse Removal Journal*, 6:8:31, August 1963.

   Pico Rivera, Calif., has passed an ordinance making it mandatory for all physicians, dentists, medical centers, and hospitals to place all refuse in locked refuse containers. The reason for this action is to make harmful refuse from the medical profession inaccessible to city inhabitants. However, the medical profession will be unable to comply with the law until a Los Angeles firm puts the first lockable refuse container on the market. [News. ⅓ p.]

2. DISPOSAL MAKES VARIETY OF LOCAL ORDINANCES. *Refuse Removal Journal*, 5:1:22, January 1962.

   A listing of various city ordinances covering regulations of (1) sanitary landfills in Philadelphia; (2) domestic refuse-burning and food-grinding equipment in the Detroit, Mich., area; and (3) disposal of refuse other than that picked up in regular collection in Lombard, Ill., and Davidson County, Tenn. Also gives ordinances of Newark, N.J., Salt Lake City, Utah, Rapid City, S. Dak., Omaha, Nebr., Albuquerque, N. Mex., and Philadelphia regarding air pollution, and ordinances of Tocoma, Wash., Sandusky, Ohio, Morgantown, W. Va., Pendleton, Oreg., and Richmond, Calif., concerning the financing of refuse disposal. [Ext. 4 pp.]

3. GARBAGE DISPOSAL SERVICE FEES CHARGEABLE TO NONUSERS. *The Public Health Court Digest*, 9:6:3, October 1963.

   A brief summary of *Cassidy v. City of Bowling Green*, 368 S.W. 2d 318 (Kentucky), Court of Appeals of Kentucky, May 31, 1963. Action to determine constitutionality of certain ordinances of the city which established a municipally operated garbage disposal system. Particularly in question is the right of the city to require those who do not use the service to pay the regular monthly charge, and the right of the city to cut off its water service to property owners or tenants whose garbage disposal bills are delinquent. The court upheld the ordinances, stating that "the right of regulation is clearly within the police power of the city." The city may require those owning or occupying property to accept its services, and it may require them to share the expenses of these services by the payment of reasonable disposal fees. [News. ½ p.]

4. NEW JERSEY SANITARY CODE SETS REFUSE LANDFILL STANDARDS. *The APWA Reporter*, 29:12:5, December 1962.

   A reproduction of the newly revised chapter of the New Jersey Sanitary Code which deals with refuse disposal. Includes six regulations: (1) prohibits refuse dumps; (2) state that the Code is not applicable to disposal of family refuse on the premises where the family resides; (3) concerns the location and planning of sanitary landfills; (4) gives requirements of firm ground sanitary landfills; (5) gives requirements of soft and unstable ground sanitary landfills; and (6) prohibits the existence on sanitary landfills of rodents and insects hazardous to public health. [Ext. 1¼ pp.]

5. NEW YORK STATE AMENDS SANITARY CODE FOR 1963. *Refuse Removal Journal*, 6:1:12, January 1963.

   There are more than 1,500 open refuse dumps in Upstate New York receiving approximately 10,000 truckloads of refuse each day. In view of the public health hazards these open dumps can cause, a new amendment aimed at eliminating these hazards and nuisances has been added to the New York State Sanitary Code. Under the new regulations, open refuse dumps may be operated only after approval of the full-time county, city, or district health officer having jurisdiction. This approval will be granted only in cases where the operation of the open dump can show that its continuance will not create a public health nuisance or hazard. Complete wording of the new amendment is given. [Ext. 1⅔ pp.]

6. OPERATION OF PRIVATE DUMP PROHIBITED. *The Public Health Court Digest*, 9:2:4, June 1963.

   A brief account of *Mile Road Corp. v. City of Boston*, 187 N.E. 2d 829, (Massachusetts) Supreme Judicial Court of Massachusetts, February 4, 1963. Action for declaratory judgment as to the constitutionality of a statute which authorized and directed the city of Boston to prohibit the dumping of trash or refuse on land located in a certain district. Plaintiff owns a large tract of land in the district, and for several years had been authorized by permit to operate and maintain a private dump. The Court upheld the constitutionality of the new statute, stating ". . . the question is whether the act is tantamount to a taking of property without due process of law . . . While it is agreed that the plaintiff is put out of business as a dump operator, the record does not show that the land cannot be filled and put to other use . . . "There has not, therefore, been a complete deprivation of property so as to be the equivalent of a taking without compensation . . ." [News. ½ p.]

7. ORDINANCES VARY WIDELY. *Refuse Removal Journal*, 5:2:27, February 1962.

   Presents ordinances concerning the fees charged by cities for the use of municipally owned refuse disposal facilities by private contractors. City ordinances included are those of Doylestown, Pa.; Cincinnati, Ohio; Edmonton, Alberta, Canada; and New York City, N.Y. Also, gives a Temple, Tex., ordinance concerning violations of the town's refuse collection and disposal laws. [Ext. 1 p.]

8. Pennsylvania Regulations on Combustion Units. *Refuse Removal Journal*, 5:12:10, December 1962.

On October 22, 1962, the Pennsylvania Air Pollution Commission passed Regulation III to prevent and control air pollution by requiring plan approval prior to the construction or modification of combustion units. Regulation III defines a combustion unit as "any incinerator or any stationary equipment used for the combustion of gaseous, liquid, or solid fuel." Excepted from commission approval are: (1) incinerators burning only rubbish with a maximum rated capacity of less than 100 pounds per hour and all other incinerators with a maximum rated capacity of less than 75 pounds per hour; and (2) combustion units in which fuel is burned at a maximum rated capacity of less than five million British thermal units per hour. [News. ⅓ p.]

9. Philadelphia Insists on Closed Refuse Vehicles. *Refuse Removal Journal*, 6:12:20, December 1963.

Gives revised municipal regulations related to the private collection of refuse in the city of Philadelphia, Pa. The regulations are concerned with procedures for applying for a refuse collection license, qualifications of collection vehicles, and the disposal of demolition refuse. [Det. 1½ pp.]

10. Refuse Regulations Are Diverse and Conflicting. *Refuse Removal Journal*, 6:6:26, June 1963.

Briefly surveys refuse regulations in various communities. Includes regulations concerning the disposal of radioactive wastes and ammunition, the provision of paths leading to refuse containers during snowy weather, separate collections of refuse, the location and maintenance of refuse containers, and the collection of yard clippings. [Ext. ⅗ p.]

11. Restrictive Practices Court Rejects Minimum Waste Paper Price. *Public Cleansing*, 53:9:431, September 1963.

For over 10 years prior to April 1963, the British Paper and Board Makers' Association recommended to its members a minimum price which they should pay to local authorities for baled mixed wastepaper. This guaranteed minimum price was originally welcomed by local authorities because it was regarded as a stabilizing factor enabling them to continue their wastepaper salvaging with confidence. After the passing of the Restrictive Trade Practice Act of 1956, it was necessary for the Association to apply for registration of their recommendation as a restrictive trade practice. The Court declared that the minimum wastepaper price agreement was contrary to the public interest. The article gives a brief history of the agreement, the judgment of the Restrictive Practices Court, and the present situation concerning the price agreement. [Gen. 3 pp.]

12. Rubbish Collection Ordinance Valid. *The Public Health Court Digest*, 9:7:2, November 1963.

A brief account of *Silver v. City of Los Angeles*, 31 Cal. Rptr. 545 (California), District Court of Appeal of California, June 12, 1963. Plaintiff instituted a taxpayer's suit for declaratory relief seeking to nullify as unconstitutional a city ordinance relating to rubbish collection, and to set aside a contract awarded for the sale of metals collected. The allegations of the complaint, in effect, set forth that the ordinance made possible the creation of a menace to public health by increasing accumulations of garbage over longer periods between pickups. The Court of Appeal affirmed the lower court's rejection of the complaint, indicating that "the city council had full power to adopt an ordinance changing the frequency of the collection of garbage, combustible and noncombustible rubbish, and decreasing the amount of segregation of rubbish to be required of householders as a condition of municipal collection thereof. . . . Since the service is not mandatory, but relieves the householder of his duty to privately dispose of his wastes, and in the opinion of the legislative body is sufficiently frequent for purposes of public health and convenience, the ordinance, . . . may well be considered as a matter of law to be entirely valid and not violative of any constitutional mandates. . . ." [News. ½ p.]

13. State Sanitary Code Chapter VIII: Refuse Disposal (as Amended June 11, 1962). *Public Health News*, 43:8:255, August 1962.

Gives the text of chapter VIII of the New Jersey State Sanitary Code which was adopted by the Public Health Council of the New Jersey State Department of Health on June 11, 1962. See item No. 4 for the regulations. [Ext. 2 pp.]

14. Terre Haute Changes Its Regulations. *Refuse Removal Journal*, 6:5:21, May 1963.

Terre Haute, Ind., has recently changed its regulations concerning refuse collection to allow for the combined storage and pickup of trash and garbage. Two notices have been sent to residents—a yellow card emphasizing that garbage must be wrapped, and a pink card illustrating the regulation size and type of trash container which should be used. [News. ¼ p.]

15. Washington Now Allows 5-Year Refuse Deals. *Refuse Removal Journal*, 6:6:25, June 1963.

The Washington State Legislature recently voted to permit refuse removal contracts of up to 5 years for smaller communities. Previously, refuse collection contracts had been limited to 1 year; this made it difficult for small towns to contract for removal, because the ceiling forbade any sensible businessman from investing in the equipment necessary to carry out the service. [News. ⅙ p.]

16. Wichita's Ordinance on Sanitation Procedures. *Refuse Removal Journal*, 6:2:27, February 1963.

Excerpts from a Wichita, Kans., law concerning commercial refuse collection. Includes ordinances covering: duty and specifications of commercial establishments in providing garbage containers; commercial garbage to be placed in containers and material prohibited from being placed in containers; placing containers for collection; removal of commercial garbage by city or licensed collectors only; charges for commercial garbage collection service by city; and days, hours, and frequency of collection and disposal of commercial garbage. [Ext. 2/3 p.]

Baskous, A. A.

17. New York State Health Department Puts Curb on Open Dumps. *Refuse Removal Journal*, 6:12:8, December 1963.

Discusses a new part of the New York State Sanitary Code which brings refuse dumps under the surveillance of the health department. The intent of the new regulation is to have refuse disposal areas operate with no public health nuisance or hazard at the lowest cost to the community. They do not insist that every community have a sanitary landfill or incineration; for many of the smaller communities this is financially impractical. Thus, operators who can show that they can operate an open dump without creating a public health problem can apply for exemption from the compacting and covering requirement and for permission to burn. The article discusses: some of the salient features of a dump—air pollution, rat and fly infestation, and water pollution; ways to ease the public relations problem in locating a disposal area; landfill for small communities; soil cover for the landfill; disposal of diseased tree cuttings; and indiscriminate dumping. [Gen. 4 pp. 4 ill.]

Bydawell, F. J.

18. Operating Cleansing Transport Under the Road Traffic Acts. *Public Cleansing*, 52:6:253, June 1962.

A report discussing the Road Traffic Acts in Great Britain and their effects upon sanitation vehicles. Includes: (1) the Motor Vehicle (Construction and Use) Regulations, 1955, Amended, which sets out the minimum requirements as to vehicle maintenance and operation; (2) the Vehicles (Excise) Tax, 1949, and various Finance Acts, regarding the scale of duty payable on various classes of vehicles; and (3) the Road Traffic Act of 1960. Also includes discussion of this report. [Det. 7½ pp.]

Hodgins, John S.

19. Smoke From the Burning of Industrial Wastes: Middlesex County Council Act. *Smokeless Air*, 33:126:324, Summer 1963.

Smoke emitted from the burning of industrial waste (highly inflammable liquids, obsolete trolley busses, electric cable, paper products and rags, and miscellaneous waste materials) has created extremely objectionable conditions in Hayes and Harlington, England, but these cases cannot be dealt with under the Clean Air Act of 1956. Powers for the control of the burning of industrial refuse were provided, however, in a recent Middlesex County bill, and ultimately became Section 47 of the Middlesex County Council Act of 1961. The article quotes this section of the act. [Gen. 2 pp.]

Orton, M. M.

20. Legal and Public Framework in Which We Work. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 18, April 1963.

Describes the section of Wyoming law that gives municipalities the authority to provide refuse services, and the garbage and rubbish ordinance in Casper, Wyo. Compares municipal and contract collection, emphasizing the importance of the wording of the contract. Discusses public relations in municipal refuse collection and disposal activities. [Gen. 2⅓ pp.]

B. FINANCES (including Costs, Fees, Taxes, etc.)

Anonymous

21. City Finds Trash Cost Reduction a Difficult Matter. *Refuse Removal Journal*, 5:3:24, March 1962.

Hopes are dim for a reduction in the $28 trash and garbage fee in the Greater Miami, Fla., area. Rapid growth in the number of homes served and a definite lag in the collection of bills have been two factors against a fee reduction. Growth last year averaged 400 new pickups a month and delinquent accounts have increased by 1 percent. A drive for efficiency has been in progress, emphasized by the firing of 11 collectors for consistent absenteeism from work. [News. ½ p.]

22. Cleansing Costs. *Public Cleansing*, 52:9:414, September 1962.

Reviews the Ministry of Housing and Local Government sanitation cost returns for 1960–61. Forty-five authorities produced a credit on their refuse disposal activities in the period under review. Of the total expenditure on refuse collection and disposal, 53 percent was attributed to labor and 34 percent to transport. The corresponding street cleaning figures are 62 and 32 percent respectively. The total expenditures for all authorities in England and Wales in 1959–60 was 33 million pounds for refuse collection and disposal and 13 million pounds for street cleaning. Figures indicate that where weighing facilities do not exist, authorities tend to overestimate their refuse intake. Sanitary landfilling still shows substantially lower costs than disposal by mechanical means. [News. 1 p.]

23. Philadelphia Firm Gets Disputed Rate Increase. *Refuse Removal Journal*, 5:7:20, July 1962.

Because of substantial losses and delinquent accounts, a Philadelphia, Pa., refuse contractor recently asked for an increase in refuse rates from $600 to $1,000 a week for the group of businesses he was servicing and that the group as a whole (instead of each individual firm) make payments to him. The business association at first refused. Refuse began to accumulate when the hauler stopped serving the association, and the city's other refuse haulers refused to take over the route. The situation soon became intolerable, and the association finally conceded the refuse rate increase when faced with punitive action from the city. [News. ½ p.]

Bates, Andrew H.

24. How To Figure for Profit—Cost Accounting. *1963 Sanitation Industry Yearbook*, p. 14.

Uses a specific illustration to show how a cost accounting system can be used by a private refuse contractor to determine costs for each item in his operation and to figure for profit in calculating a bid price. Covers the following areas: interest payments on a newly purchased refuse vehicle; typical fixed costs; typical variable costs; salary cost; payroll taxes; depreciation costs; overhead; operating, and total costs; family expenses and profit; weekly, daily, and hourly costs; projected annual costs; and petty cash disbursements. By analyzing each cost in a cost accounting system, a contractor is able to isolate danger spots in his business and correct them. (See items No. 25 for part II and No. 26 for part III.) [Det. 3 pp.]

25. Figuring for Profit—II. How To Make the Price Fit the Job. *1963 Sanitation Industry Yearbook*, p. 22.

Shows, through an illustration, how a private refuse contractor should price his jobs. Explains: (1) how to calculate essential statistics for a residential service, including amount of refuse collected each day and each hour, the cost of collecting each yard of refuse, the number of homes serviced each hour, cost of collecting per mile, and the cost to service each residence; (2) how to estimate the cost for making a special pickup; (3) how to find hourly overhead; (4) how to calculate the cost of work on Sunday; (5) how to spread costs among several commercial customers to reduce the cost for servicing each business; and (6) how to calculate a fair price for servicing each establishment in a shopping center. It is important to remember that the amount decided on by the private contractor for profit and living expenses should be included as a cost factor in determining the price of the job. (See items No. 24 for part I, and No. 26 for part III.) [Det. 3 pp.]

26. Figuring for Profit—III. Here's How To Bid for the Contract. *1963 Sanitation Industry Yearbook*, p. 40.

Explains how a private refuse contractor should determine his bid price for municipal and shopping center refuse service contracts, through the use of a specific illustration. The procedures for the municipal contract include: projection of costs into the years covered in the contract; addition to these costs of interest paid on a performance bond; and determination of average weekly costs and average costs per pickup. The procedures for the shopping center contract include: determination of daily, weekly, and yearly costs; addition to these costs of the extra costs from collecting refuse on special shopping days; and annual addition to costs to provide for expected expansion of the center. (See items No. 24 for part I and No. 25 for part II.) [Det. 2 pp.]

Crane, Larry E.

27. Cost Comparisons of Refuse Disposal Methods. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 21, April 1963.

Discusses the advantages and disadvantages of the various refuse disposal methods, and lists six elements of cost which can be standardized for use in a cost accounting system. Discusses the costs of the following disposal methods: (1) open dumping; (2) dumping with controlled open burning, including seven requirements which should be followed in making this a satisfactory disposal method; (3) sanitary landfilling, giving 12 factors influencing landfilling costs and typical operating costs for five particular locations; (4) incineration, listing operating costs for ten different locations; and (5) composting, presenting factors influencing composting costs and operating costs for eight foreign and American installations. [Det. 8½ pp. 17 ref.]

Eddy, Harrison P., Jr.

28. Revenue Bonds and Service Charges for Financing Waste Disposal Facilities and Services. *1962 American Public Works Association Yearbook*, p. 83.

Discusses the use of revenue bonds and service charges for financing the construction of sewerage and refuse disposal works and the services of disposal of these wastes. Explains why revenue bonds should be attractive to municipalities, what makes these bonds good security for investors, and what makes the project and the bond issue successful. Compares revenue bonds with general obligation bonds. Frequently it is easier to arrange for the sale of revenue bonds than general obligation bonds, and revenue bonds supported by service charges are more desirable because the municipality is using a source of income other than general taxation. Also, when financing is provided by revenue bonds, the investors are interested in the success of the project, and not simply in the credit of the municipality and collection of taxes as in the case of the general obligation bonds. In order to insure the success of the project and bond issue, the municipality should be aided by a team of professional assistants consisting of the official board, the consulting engineer, the bond attorney, the financial adviser, and the trustee. [Gen. 4½ pp.]

Mason, W. J.

29. The Economics of Public Cleansing. *The Sanitarian*. 72:2: 116, November 1963.

Included in the discussion are the following: cost and efficiency in the sanitation services; the composition of refuse; refuse storage—standard dustbins, other types of dustbins, large refuse containers, storage containers for dustless loading; accessibility to the storage container; refuse removal—labor, vehicles, trade refuse charges; refuse disposal—the problem, controlled tipping, separation and incineration, pulverization and/or composting: salvage—history, general considerations, recovery and sale of materials (wastepaper and metals). Economic aspects of these cleansing services are emphasized. Discussion follows the report. [Det. 13½ pp. 3 tab. 4 ref.]

Ministry of Housing and Local Government

30. *Public Cleansing Costing Returns.* London: Her Majesty's Stationery Office, 1963. 58 pp.

A book of tables containing statistics of the collection and disposal of house and trade refuse and of street and gully cleaning in cities and towns in Great Britain. The tables, covering the years 1961–62, have been compiled from returns submitted by local authorities of the larger urban areas and a number of selected rural areas in England and Wales. They include 471 returns (58 from rural areas) relating to refuse collection and disposal, and 410 returns from urban areas relating to street and gully cleaning. Contains the following tables: table 1, amount of refuse collected (arranged according to size and type of authority); table 2, unit costs of collection and disposal (arranged according to size of authority); table 3, range of collection and disposal costs (highest and lowest for each class of authority); table 4, costs of collection per ton of refuse; table 5, costs of disposal per ton of refuse (compared according to method of disposal); table 6, costs of labor and transport in collection and disposal per ton of refuse; table 7, average value, gross income from sales, quantities of salvage collected (arranged according to kind of material salvaged); table 8, refuse collection and disposal data for the individual authorities; and table 9, street and gully cleaning data for individual authorities. [Det. 58 pp.]

Moak, Lennox L.

31. Refuse Collection and Disposal Service Charges. Chicago: Municipal Finance Officers Association of the United States and Canada, 1962. 87 pp.

A limited survey of the extent to which 380 local governments in the United States and Canada perform refuse collection and disposal functions and the manner in which they finance the refuse functions which they perform. The survey was conducted largely through a two page questionnaire distributed to 676 local governments in the United States and Canada primarily in January 1961. Questionnaires were mailed to all cities with a 1960 population of more than 50,000; to 257 cities with a population of less than 50,000; and to 68 counties and special districts. The response amounted to 56 percent of the entire group and was fairly well distributed among major population groups. The questionnaire undertook to elicit information on the following points: which of six categories of refuse collection activities were being performed by the local government; the extent to which refuse disposal services were provided; the use and nonuse of service charges for the refuse collection and disposal activities; the use of other governments, private contractors, private collectors, and franchise operators; the extent to which refuse functions for which the local government acknowledged responsibility, were self-supporting; and the schedule of charges for refuse services in the local governments in which such service charges were in force. To facilitate handling of data, local governments are divided into five basic groups and the discussion is organized largely around these groups: (1) local governments which impose service charges for all refuse collections performed; (2) those which impose service charges for a portion of their refuse collection functions; (3) those financing their refuse collection exclusively from general revenue; (4) those providing for collection of refuse by franchise operators; and (5) local governments reporting no direct operations or responsibility for refuse collection. [Det. 87 pp. 13 tab.]

Murphy, T. B.

32. 64 Cents Per Customer Per Month. *The American City*, 77:1:123, January 1962.

The city of Corpus Christi, Tex., uses an electronic data processing system for billing 46,000 residents for municipal water, gas, sewage, and refuse services. Describes the system, and gives factors for a municipality to consider in deciding whether or not to use a tabulating system. [Gen. 2 pp. 1 ill.]

Shuval, Hillel I.

33. Composting Costs in Israel. *Public Cleansing*, 53:4:169, April 1963.

A detailed discussion of composting costs in Israel. Present data on: (1) The compost market in Israel. Estimates indicate that even if all of Israel's municipal refuse were composted, it would meet only one-third to one-half of the demand for compost in the country. (2) Prices paid for finished compost (15s. to 35s. per cubic meter). (3) Prices paid for salvaged ferrous metals (£5 12s. 0d. per ton) and rags (£8 15s. 0d. per ton). Also gives cost data for the two composting installations at Haifa and Tel Aviv: (1) capital costs—£97,000 and £427,000, respectively; (2) electricity used—16 kilowatt hours per ton and 9 kilowatt hours per ton; (3) subsidies paid by municipalities—8s. and 4s. per ton of raw refuse; and (4) net income before taxes—£8,000 and £63,000 a year. [Det. 3 pp.]

Walton, Charles

34. A Method of Computing and Predicting Overall Cost of Solid Waste Disposal for a Municipality. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 35, April 1963.

Outlines a method for computing the costs of refuse collection and disposal of a municipality, using the the city of Laramie, Wyo., as a hypothetical example. Basic steps include: (1) listing of essential statistics; (2) calculation of number of daily pickups; (3) computation of number of collection men needed; (4) computation of number of trucks needed; (5) estimation of equipment costs; (6) estimation of personnel, contractual services, and materials needed, and costs of these items; (7) recap of costs per year; and (8) revenue projection on yearly basis. Also outlines general information on sanitary landfilling. Includes top cover, site collection, methods and operations, costs, and major types of equipment used. [Det. 5 pp.]

C. STORAGE (including Methods and Equipment)

Anonymous

35. APWA Begins $35,000 Refuse Sack Study at Sarasota. *The APWA Reporter*, 29:6:20, June 1962.

The Board of Trustees of the American Public Works Association Research Foundation has agreed to make a study of the frameholder-disposable sack system of on premise storage and collection of domestic refuse. The project is estimated to cost approximately $35,000 and is being financed by the Kraft Paper Association. The agreed procedure is for full-scale testing on one or more refuse collection routes in three or four cities with varying economic, climatic, and collection procedure differences. Qualitative and quantitative studies will be made, each lasting for 60 days. The first test has been scheduled for Sarasota, Fla., in June 1962, encompassing hot weather and rainy weather conditions. Future testing tentatively scheduled for Fort Worth, Tex., and Buffalo, N.Y., will be done under extreme dry weather conditions and under winter conditions, and with varying route conditions such as environment, collection procedure, and cost basis. [News. ½ p.]

36. Bigger Containers for Higher Flats? *Public Cleansing*, 53:12:589, December 1963.

Describes an experiment carried out in Islington, England, to find out if storage containers of 12 cubic yard capacity or more could satisfactorily be used under refuse chutes in multistory buildings without the need for manual or mechanical assistance. No container chamber in any of the tall buildings in the town was large enough to hold the 12-cubic yard container, so a mock container and chute system was built at the Islington refuse loading depot. The container measured 7 feet 3 inches by 7 feet 6 inches by 7 feet 6 inches high, and the chute was 12 feet long, 18 inches in diameter, and 3 feet above the top of the container. The experiment, although carried out under simulated conditions, demonstrated that a 12-cubic yard container can be filled to capacity without difficulty. [Gen. 3 pp. 2 ill.]

37. Bins or Sacks: Economic Considerations. *Public Cleansing*, 53:8:398, August 1963.

The one significant disadvantage of the paper sack refuse storage and collection system, outweighing all others, is the additional expense of the sacks themselves. The article gives several arguments against this alleged disadvantage: (1) the sack is now being manufactured for a lower price than when the system was first being considered; (2) even if costs rises by the use of the sack, the merits of this system offset any cost increase; and (3) labor savings help to offset the cost of the sacks. Discusses factors which should be considered when estimating the cost of the paper sack system. Shows that for units of 10,000 population (2,700 houses) the cost of the paper sack system and the dustbin system are the same, using as a basis of calculation the annual Costing Returns of the Ministry of Housing and Local Government. (See item No. 226.) [Det. 3 pp. 1 tab.]

38. Custom-Packaged Garage. *Canadian Municipal Utilities*, 101:7:37, July 1963.

Describes the testing of a system of refuse collection and storage in the township of Scarborough, Ontario, Canada, using polyethylene bags as refuse can liners, and general results of the test. A representative test area comprising 722 single family homes was selected; a period of 4 weeks was established as a reasonable duration for the test to continue; and the majority of bags distributed were of 2 mils thickness, although a number of bags of 1½ mils thickness were used in one specific area to make comparisons. The test demonstrated that: the use of bags offered considerable advantages over conventional methods; the bags of both thicknesses were entirely satisfactory for the intended purpose; there was no loss of householder interest after the initial introduction of the bags; the bags were not noticeably affected by cold, snow, or ice; the garbage they contained did not attract scavenging animals any more than that in conventional garbage cans; the appearance of the streets was greatly improved; and use of the bags permitted collection times to be reduced by about 26 percent. [Gen. 1 p. 1 ill.]

39. Disposable Bags. *The American City*, 78:10:32, October 1963.

A brief discussion of the study conducted by the American Public Works Association on the use of disposable paper bags for household refuse handling. Gives five conclusions reached by the investigators. One of the major drawbacks of the system is the cost of the paper sacks, but studies in Great Britain and at College Park, Md., reveal that there is a substantial savings in the cost of labor offsetting the expense created by the sacks. [Gen. 1 p. 1 ill.]

40. Disposable Paper Bags for Refuse Collection. *Public Works*, 93:9:166, September 1962.

A test of the use of disposable paper bags for refuse collections will cover 150 homes in College

Park, Md., and will extend over a 60-day period. The test will be similar to the one successfully conducted in Montclair, N.Y. [News. ¼ p. 1 ill.]

41. Falkirk Design Rate-borne Dustbins. *Public Cleansing*, 52:6:261, June 1962.

In his report for 1960, Mr. Alexander French, Director of Cleansing, Falkirk, Scotland, states that by 1962–63, it is hoped that the whole town will be supplied with municipally provided dustbins. The 1½-cubic-foot dustbins will have several novel features: the lids attached to the carrying handles, fall clear of the mouths of the bins so that refuse can be emptied easily; the carrying handles are plastic coated to reduce noise; the plastic coatings are colored in one of four colors to identify the bins with particular areas; and serial numbers are attached to the bins to identify them with individual houses. [News. ½ p.]

42. Garbage Down the Hatch. *Sunset*, 130:5:147, May 1963.

Presents two ways of locating refuse containers conveniently to eliminate the need for frequent trips outdoors. These ideas can be adapted wherever there is outside access for emptying the garbage cans. Both solutions place the cans within reach of the kitchen sink; neither takes up undercounter storage space. Scheme A involves double doors over the counter—one for each can—opening at the approximate height of the can tops. The containers are placed in a cabinet added to the outside wall in the outdoor service yard. Scheme B places the refuse containers in the space behind the undersink cabinet with a metal chute and hole in the counter. [Gen. ⅔ p. 4 ill.]

43. Housewives' Revolt. *Newsweek*, 61:11:36, March 18, 1963.

Separate versus combined refuse storage and collection is a heated issue in Los Angeles, Calif., at the present. The city council recently voted not only a year's renewal of the edict making citizens segregate tin cans from the rest of their garbage, but a stiff penalty for violators—a $500 fine and 6 months in jail. After this action, protests from citizens resounded, and easily a third of the residents did not comply with the law. Mayor Sam Yorty and most of the city council are arch foes over this issue. Councilman Karl L. Rundberg explained that collection and sale of old tin cans earns the city $300,000. (But this large figure results in a tax savings of only 2 cents a month per household.) The city council has now repealed the hated penalties for violations, but the law still calls for segregation of refuse. [News. ½ p. 1 ill.]

44. How One Lady Bought Her First Plastic Container. *Refuse Removal Journal*, 5:12:25, December 1962.

A humorous story describing how a salesman sold a lady her first plastic refuse container. [News. 1½ pp.]

45. Los Angeles Embroiled in Hot Refuse Dispute. *Refuse Removal Journal*, 6:4:20, April 1963.

Presents the history and present-day status of the refuse dispute in Los Angeles, Calif. By law, residents are supposed to separate their garbage and refuse from tin cans and salvage metals; garbage and refuse collection occurs once a week and metal pickup once a month. The mayor of Los Angeles has, however, told residents to ignore the city council edict and to mix their trash without fear of retribution. Councilmen have not tried to have law breakers prosecuted because they have come up against the threat of defeat in the next election or have heard the rumbles of a recall movement. [Gen. 1 p.]

46. New Type of Standard Dustbin. *Public Cleansing*, 53:12:598, December 1963.

The essential feature of the dustless refuse collection system is the dustbin with a hinged lid. Up until now there has been no British standard for this type of dustbin, but the B.S.I. has recently prepared a specification to meet this need at the request of the Institute of Public Cleansing. Four different patterns of bin are dealt with, for use with four different types of refuse collection vehicles. [News. ⅔ p.]

47. Old People Prefer Paper Dustbins. *Public Cleansing*, 53:4:198, April 1963.

On a council estate for elderly people at Wetherby, Yorkshire, England, the changeover from dustbins to paper sacks has met with complete success. No longer do the elderly tenants struggle with jammed dustbin lids, and fixing a fresh sack each week is easier than keeping the dustbin clean. Because it is so much easier for the refuse collector to take the sack away, and because the sack and sack holder are so compact, it has been possible to install them inside a small storeroom off the front porch. [News. 1 p. 1 ill.]

48. Paper Containers Trim Maintenance Cost 25 Percent. *Refuse Removal Journal*, 6:12:14, December 1963.

One of New York City's largest banks, with 10 branch offices in the borough of Manhattan, has realized many important cafeteria improvements by changing to a new refuse disposal system utilizing enameled cabinets lined with large, heavy-duty, disposable paper bags. Among the improvements are maximum sanitation, a more attractive lunching environment, and a better than 25 percent time reduction in maintenance of disposal units. [Gen. 1½ pp. 2 ill.]

49. Sack for the Litter Bin. *Public Cleansing*, 53:1:26, January 1963.

There is a continuing increase in the use of paper sacks in place of dustbins for refuse storage and collection. Sweden, a leading producer of wood-pulp, was the first country to test the idea on a wide scale. About 30 British authorities are now conducting experiments with the paper sack system, and this number is expected to increase to about 50 by the end of 1963. Paper sacks may also have a future as litter bins. [News. 1 p. 1 ill.]

50. *Safe and Sanitary Home Refuse Storage.* Public Health Service Publication No. 183. Washington, D.C.: U.S. Government Printing Office, May 1963. 5 pp.

Discusses six steps to follow in handling refuse to ensure attractive and sanitary conditions: (1) providing and using proper containers; (2) maintaining the containers in a sanitary condition; (3) placing the containers in the right place at the right time; (4) draining and wrapping garbage and bundling bulky refuse; (5) where required, separating garbage, ashes, and rubbish; and (6) removing any trash from yard, basement, or attic each week and setting it out for collection. Also, briefly defines garbage, ashes, and rubbish. [Gen. 5 pp. 4 ill.]

51. Safe and Sanitary Home Refuse Storage. *Refuse Removal Journal*, 6:5:18, May 1963.

Reprint. (See item No. 50.) [Gen. 1 p.]

52. Scots Cleansing Law a Faulty Instrument. *Public Cleansing*, 52:6:261, June 1962.

Mr. John Lyle, Director of Cleansing, in his report for 1961 of the North Eastern Division of the County Council of Stirling, tells of the miscellaneous selection of containers placed out at curbside by residents and of the refuse from these uncovered containers being blown over gardens and streets. Contends that provision for standard dustbin should be incorporated into the Scottish Cleansing Law. [News. ½ p.]

53. "Trim Town" Refuse Containers. *Public Works*, 94:6:166, June 1963.

Briefly describes a municipal refuse removal system that utilizes stationary steel receptacles and disposable paper bags. The system was recently successfully tested in a year-long project, the last part of which was conducted in Buffalo, N.Y., under severe winter conditions. The system consists of a metal cabinet with a hinged top and hinged front door, and a two-ply, water repellent, 30-gallon paper bag attached inside the cabinet. [News. ⅔ p. 2 ill.]

54. Use of Paper Garbage Containers. *Public Works*, 93:11:148, November 1962.

A complete description of the paper bag refuse collection system. A study has been made by a West Virginia paper company giving details of the collection of garbage from 500 homes in Montclair, N.J., following a successful 90-day test of the system. The study indicated that aside from the advantages it offers in conveniences, appearance, and sanitation, the new bag system will cost $2 less a year for each household than the conventional refuse can system. Under the bag system, the collector has to make only a one-way trip—from location of the refuse to the truck—and can carry more refuse per trip because of the much lighter weight of the bag. The bags are made of the strongest single-ply paper ever constructed and will hold wet garbage, jagged tin cans, glass, etc. in all kinds of weather. Two types of bag holders are offered—portable or stationery. In a survey conducted among householders in the trial area, 80 percent preferred the paper bag system to garbage cans. [Gen. 1 p.]

Bevan, R. E.

55. Refuse Storage in Paper Sacks. *Public Cleansing*, 52:5:190, May 1962.

A detailed interim report on the progress of an experimental pilot scheme of about 2,500 houses in the Wythenshawe, England, area to obtain information on refuse storage in paper sacks. Describes: (1) the distribution of the paper sacks and holders to the residents, including preparations made beforehand and difficulties incurred during distribution; (2) collection operations, and the vehicle used in collection; (3) controlled tipping of the refuse sacks; (4) the three types of paper sack holders used; (5) complaints made by residents about the paper sack system and action taken by the supervisory officers in correcting them; and (6) advantages and disadvantages realized by using the system. Also gives a comparison of costs of the dustbin and paper sack systems. [Det. 6½ pp. 1 tab.]

Buchwald, Art

56. Art Buchwald Interviews. *Refuse Removal Journal*, 6:6:8, June 1963.

A humorous article concerning the refuse dispute in Los Angeles, Calif. Two Hollywood celebrities who were interviewed by the author comment on the separate collection of bottles, tin cans and other refuse, and on the recent law passed by the city council making violations punishable by a $500 fine and 6 months in jail. [Gen. 1 p.]

Crane, H. M.

57. Refuse Collecting Gets Easier and Better. *The American City*, 78:12:28, December 1963.

The city of La Grange, Ga., recently installed a container system into its refuse collection system to service hospitals and schools. With their tight covers, the new containers keep odors confined, eliminate fires, and discourage scavenging animals and vermin. Sanitation men also applaud the cable-operated pickups which eliminate strained backs. [News. ½ p. 2 ill.]

Edwards, R. A.

58. In the Bag for Keeps. *The American City*, 78:4:89, April 1963.

College Park, Md., has found the paper sack refuse collection system to be far superior to any conventional collection system now available. Tests were recently conducted in a 100-home trial area in this Washington, D.C., suburb, and time studies showed that it took about one-third of the time to collect the same amount of refuse in paper containers as it did in conventional containers. But labor costs represent only a part of the savings realized from installation of this system. The system allows the city to use open collection vehicles instead of compactors, and the open trucks are less expensive to purchase and to operate. A survey of the trial area also indicated overwhelming public acceptance of the paper sack system: 90 percent were willing to purchase either the paper containers or a holder: 89 percent favored the use of paper containers over the old system, 92 percent felt that there was much less noise from collections, and 88 percent felt that litter had been reduced. [Det. 3½ pp. 6 ill. 2 tab.]

French, Alexander C.
59. Falkirk Designs New Bins for Municipal Scheme. *Public Cleansing*, 52:9:382, September 1962.

Describes in detail Falkirk's experiences in establishing a municipal dustbin scheme. After observation of the initial scheme in 1955 which had to be discontinued due to capital restrictions and credit squeezes, and after tests with other dustbins, a final bin was designed and issued to residents beginning in 1961. The final bin, with a capacity of 1.36 cubic feet, features: a lid attached to the handle and clearing the mouth of the bin to allow discharge of refuse without spillage; a plastic coated handle to reduce noise, with the coating in various colors to identify the area in which the bin was issued; and code letters and a serial number to identify the residence to which it belongs. Lists the benefits which have been realized due to considerations given to the householder, refuse collector, and local authority in planning the dustbin scheme. [Det. 4½ pp. 2 ill.]

Hennig, E. Glenn
60. Refuse Collection Equipment Will Pay for Itself in 2 Years. *Public Works*, 93:5:112, May 1962.

Describes the new containerized refuse collection system in Orlando, Fla. The city recently completed the final stage of installing the system, and it is now claimed to be the only 100 percent containerized city in the world. Residents and businesses are enjoying the highest quality of collection service in the city's history, and in addition the city is saving $600,000 annually in collection expenditures. [Det. 2 pp. 4 ill.]

Magy, Harvey I.; and Black, Ralph J.
61. An Evaluation of the Migration of Fly Larvae From Garbage Cans in Pasadena, Calif. *California Vector Views*, 9:11:55, November 1962.

An account of a 5-week study conducted in Pasadena, Calif., to evaluate the problem of migration of fly larvae from garbage cans. Describes the objectives, procedures, and results of the study. Two species of green bottle flies (*Phaenicia cuprina* and *Phaenicia sericata*) were the predominant flies recovered. Wrapped garbage stored separately in cans that were emptied once a week produced fly larvae which migrated from the containers. An average of 448 flies per can migrated each week. Two-thirds of the refuse cans produced flies for at least 1 week during the 5-week study. An average of 55.7 percent of the containers produced flies each week. Cans were rated as to whether they were satisfactory or unsatisfactory, and only 26 percent of the satisfactory cans produced flies, while 46 percent of the unsatisfactory containers produced flies. [Det. 5 pp. 3 tab. 1 gr. 1 ref.]

Magy, Harvey I.; and Black, Ralph J.
62. California Study Shows Fly Migration From Cans. *Refuse Removal Journal*, 6:4:11, April 1963.

Reprint. (See item No. 61.) [Det. 3 pp. 2 tab. 1 ref.]

Marriott, John; and Holt, Arthur
63. Refuse Collection—The Paper Sack System. *The Sanitarian*, 70:6:289, March 1962.

A thorough discussion of the paper sack refuse collection trials in the Wetherby Rural District of England. Begins by discussing merits and demerits of the paper sack system, motivating factors for replacing the dustbin system with paper sacks, the composition of refuse, and development of the paper bag. These items concerning the Wetherby trials are included: statistics of the district; the establishment of the pilot scheme; publicity; choice of site for pilot tests, period of the test; types of holders; fixing of the wall-type holders—method, the cartridge hammer, cost of fixings, difficulties of fixing, positioning of the holder; risk of damage to property; organization of fixing; size of fixing team; types and capacities of sacks; collection methods; sack failures—damage by animals, adverse weather conditions, deposit of hot ashes, overfilling, misuse; other tests; results of scheme to date; refuse vehicles used; disposal; costs; and conclusions from the trials. [Det. 13 pp. 4 dr. 3 tab.]

Roebuck, A. B.
64. Disposable Garbage Bag. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 47, April 1963.

Discusses the use of heavy-duty, weather-resistant, disposable paper bags for refuse storage and collection. Describes the extent to which the system is presently being used in Europe, and its progress in the United States, and explains why the paper bag has been more successful in Europe than in this country. Lists eight benefits which can be derived from the system and seven areas, other than residences, where the paper bag could be used. Also briefly discusses cost of the system and financing its installation. [Gen. 5 pp.]

Slaybaugh, Dean

65. The Flies Disapproved. *The American City*, 77:2:22, February 1962.

To solve the problem of unsanitary refuse containers with their innumerable flies, a board of citizens cooperated with the officials of Borger, Tex., to conduct an educational campaign, condemn the unsuitable cans, and offer adequate containers for sale to the residents at a reasonable price made possible by volume purchasing. The results were disappearance of the flies and much improved conditions of the alleys and backyards. [News. ⅔ pp. 2 ill.]

Smith, Carl D.

66. Storage and Collection of Household Refuse. *1963 American Public Works Association Yearbook*, p. 320.

Discusses health problems created by the improper storing of garbage. Describes the process by which flies propagate. Some studies have revealed that twice-weekly refuse collection and strict adherence to the draining and wrapping of garbage will reduce the number of flies. In the projects involving paper bag refuse storage, much is said about economy, ease of handling, and esthetic value; it would be informative to have some studies done relative to fly, mosquito, and rodent control with this type of refuse storage. A concentrated rat extermination program should go hand-in-hand with a program of securing adequate and proper storage of garbage. The answer to good garbage storage, collection, and disposal lies in a good ordinance fairly and fully enforced. Lists nine items which such an ordinance should include. [Gen. 3½ pp.]

Smithen, John

67. Our Merchants Like Big Garbage Cans. *The American City*, 78:7:23, July 1963.

Denison, Tex., is now using a containerized system for the collection of refuse from its businesses. The system employs one 24-cubic-yard compaction truck and 121 2-, 3-, and 4-cubic-yard containers. Previously, three men with one 16-cubic-yard packer and one white wing to keep the alleys clean were needed for the commercial refuse collection job that now requires only one collector and the new containerized system. The business people also are much more pleased with the new system. [News. 1 p. 2 ill.]

Stirrup, F. L.

68. Public Cleansing and Housing Development. Part *I. Housing*, 25:1:22, June 1963.

Examines the changing composition, volume, and density of refuse, and the various methods of refuse storage. Includes the chute system, the dustbin system, the paper sack system, and the bulk container system. (See item No. 138 for part II.) [Gen. 4½ pp.]

Wagner, Daniel J.

69. Cleaner and Cheaper Collections. *The American City*, 77:10:15, October 1962.

Describes the new containerized commercial refuse collection system in Palm Springs, Calif. Attractive containers have replaced smelly, old, fly-covered cans, and the city saves $13,000 anually in labor expenditures with the new system. [Gen. 1 p. 2 ill.]

D. COLLECTION AND DISPOSAL—General

Advisory Commission on Intergovernmental Relations

70. "Refuse Collection and Disposal" (Chapter 3, Sec. J). *Performance of Urban Functions: Local and Areawide.* Washington, D.C.: The Advisory Commission on Intergovernmental Relations, September 1963. 283 pp., offset.

Discusses refuse collection and disposal as one of the many social services which a municipality must provide its citizens. Includes: a statement of what this service involves; a brief summary of the various disposal methods used; the variety of ways in which governments discharge their responsibility for disposal; current practices of governments in providing this service; the roles of State and national governments in refuse collection and disposal; standards of service; application of selected economic and political criteria; and a listing of some of the metropolitan areas which provide refuse disposal on an areawide basis. [Gen. 9½ pp. 9 ref.]

Anderson, J. Robert (Editor)

71. Community Sanitation Surveys. *Virginia Health Bulletin*, 16:2:2, June 1963.

Describes the community sanitation survey, a survey which is conducted by local communities in cooperation with local, State, and Federal health agencies to determine the sanitary condition of the community environment and recommend necessary improvements. Includes: facilities surveyed; public health significance of these facilities; and procedures used in the surveys. Among the factors surveyed are: land use; deficiencies in refuse storage, collection, and disposal practices; existence and location of refuse and rubble accumulations and other rodent harborage; location of vacant and waste land which might present sanitation of pollen production problems; and vector propagation and data for evaluation of corrective operations. [Det. 10½ pp. 10 ill.]

Anonymous

72. BROOKLYN EAST. *Sweep*, 4:1:8, Spring 1962.

Briefly describes the extent of the sanitation services in Brooklyn East, N.Y. Includes: refuse collection; street sweepings; cleanup during the annual model airplane meet and at the open-air markets; and leaf removal. [Gen. 2 pp. 1 ill.]

73. BUILDINGS WRECKED FREE BY CITY SANITATION MEN. *Refuse Removal Journal*, 6:11:8, November 1963.

Describes the refuse collection and disposal system in River Rouge, Mich. The system has recently been renovated to provide for a more efficient and sanitary service. Among the changes include a new municipal incinerator, replacement of paper cartons and rusted-out pails and cans used for household refuse storage with newly painted 55 gallon drums and twice-a-week refuse collection service for residential areas and three-times-a-week service for commercial establishments. There are also several unique services provided by the municipal refuse collection crews, including the cleaning out of cellars of the residences, the cutting down and carrying away of diseased or dead trees, the removal of discarded appliances and furniture, and the demolition of old buildings. These services are performed free of charge, even though the annual charge for the entire refuse collection service is low—only $0.90 per capita. [Gen. 2½ pp. 4 ill.]

74. BURNLEY REPORTS . . . *Public Cleansing*, 53:10:501, October 1963.

Briefly talks about refuse collection and waste paper salvaging in Burnley, England. The borough is divided into eight rounds, each served by a refuse vehicle and four loaders. A continuous weekly domestic refuse collection is maintained throughout the year, except for two holiday periods. Rate of collection averages 24 bins per man-hour, which is not bettered by any other town in the area. From a recent analysis of domestic refuse from comparative properties, a significant decrease in the density of refuse (33⅓ percent) was discovered. Design of refuse collection vehicles will have to be given careful consideration in the future when replacements become necessary. The city has issued 2,282 cotton bags for the separate storage of wastepaper in pursuing the policy of earning money to offset refuse collection costs. In 1962–63, the city made £23,070 from salvage sales, the majority of which came from the sale of waste paper. [Gen. 1½ pp.]

75. BUSY AT BARROW. *Public Cleansing*, 52:2:90, February 1962.

Discusses two papers presented at a North-Western Centre Meeting in Barrow-in-Furness, England. The first paper describes the De Roll system of incineration and steam production, together with its use in Switzerland for providing heat on district heating schemes. The second paper describes 16 years of advancement in sanitation services in Barrow-in-Furness. [Gen. 3½ pp.]

76. CLEANSING AT THE OTHER SIDE OF THE WORLD. *Public Cleansing*, 53:6:305, June 1963.

Report on a paper, entitled "Sojourn Down Under," by Mr. Len Collins, giving an account of sanitation activities in Wellington, New Zealand. Refuse removal services were found to be extremely poor in this city. More than 50 percent of refuse collection is done by private contractors, many of whom do not operate in a sanitary way. There are no standard dustbins in use; all are of varying sizes and shapes. Much of the trade refuse is collected by the city without charge, due to the inability of the staff to cope with the investigation work involved. Indiscriminate tipping and the transporting of refuse in uncovered trucks are also problems in the city. [Gen. 4 pp.]

77. CLEANSING IN SCUNTHORPE. *Public Cleansing*, 53:10:509, October 1963.

A general view of past, present, and future refuse collection and disposal in the city of Scunthorpe, England. Includes: quantities and weight of refuse generated; equipment, labor, and systems used in refuse collection; the collection of trade refuse; refuse disposal facilities—tipping sites, refuse depots, and pulverizing plant; the bin bonus scheme; and the land problem. Discussion follows the report. [Gen. 11 pp.]

78. CLEANSING PROBLEMS IN NAIROBI. *Public Cleansing*, 52:3:111, March 1962.

A description of refuse collection and disposal and street cleaning in Nairobi, Kenya. Refuse is collected three times a week in all areas, except in the Central area and at commercial establishments where it is collected daily. Twenty 15-cubic-yard refuse trucks, two 14-cubic-yard bin-container vehicles, 25,000 dustbins, and 114 bin containers are used for this service. Over 300 tons of refuse are disposed of daily in the city's sanitary landfill. The central area of the city is swept nightly, and elsewhere sweeping is done regularly by small sweeping teams. [Gen. 2¼ pp.]

79. COLLECTION COSTS PUSH ILLINOIS TAX LIMIT CEILING. *Refuse Removal Journal*, 6:6:6, June 1963.

Discusses the refuse collection and disposal situation in Chicago, Ill., and its suburbs. Many communities in the area have found that they cannot operate refuse collection services as cheaply as large private firms, and have changed to the private contract system. In Chicago the city collects refuse from residences, and private haulers make the collections from large apartments and industrial and commercial establishments. Combination of the State-imposed ceiling on refuse removal taxes and rising costs have forced some communities to subsidize private contractors to keep their disposal costs down. There is a trend in the area toward disposal by incineration due to the scarcity of disposal sites near collection areas. Chicago operates three incinerator plants to dispose of 88 percent of its refuse, and a fourth is being constructed which will bring this figure up to 100 percent. Also, a 5-year contract has been signed with a Texas firm for the sale of salvable metallic residue. Recently the railroad teamed up with one of the city's private disposal companies for the construction of a 400-ton-per-day incinerator at the railroad's steam generation plant. The incinerator, which serves 80,000 families in the Chicago suburbs, is claimed to be the largest family-owned facility of its kind in the world. [Det. 2⅔ pp. 3 ill.]

80. Dallas Making Gradual Changeover To Packers. *Refuse Removal Journal*, 5:5:22, May 1962.

A discussion of the municipal refuse collection and disposal operations in Dallas, Tex. Refuse in the downtown areas is collected daily, in business districts of residential areas and shopping centers three to seven times a week, and in residential areas once or twice a week. Sixty percent of the refuse collection is done from alleys, 25 percent is carried out from the premises, and the remainder is set out on the curb. Recently, the sanitation division has been converting from open trucks to packers, and as a result less trash has been scattered and the employee accident rate has decreased. Disposal is entirely by sanitary landfill; the city operates eight such sites at the present time. [Gen. ½ p.]

81. Detroit Incentive System Saves $2 Million Yearly. *Refuse Removal Journal*, 6:9:18, September 1963.

Discusses the refuse collection and disposal system in Detroit, Mich. The city has separate garbage and trash pickups, the former being made once a week and the latter twice each week. Commercial refuse is handled by both the city and 77 registered refuse haulers. The city is divided into seven subdistricts to facilitate rubbish collection. Disposal is accomplished by a municipal sanitary landfill and four centrally located municipal incinerators. The city employs three relay stations to shorten the haul to the incinerators. By adopting a route incentive system, whereby a collection crew is assigned a specific task which it is expected to complete by the end of each working day, the city has been able to reduce the number of collection trucks and laborers employed, and save $2 million annually. [Gen. 2⅔ pp. 5 ill.]

82. 40 Years On . . . and Basically the Service Is the Same. *Public Cleansing*, 53:2:78, February 1963.

Briefly discusses refuse collection and disposal in Dudley, England. The refuse service is being conducted basically in a manner with very little difference from that of 40 years ago, which may be due to lack of imagination or lack of financial adjustment. Dustless collection has been introduced in one area of the city, but officials doubt whether this is the ultimate answer in refuse collection. Weekly refuse collection service has been maintained despite a daily labor shortage of 13.7 percent. Collection costs have increased due to increasing wages and initiation of a bonus scheme. The city operates a municipal dustbin scheme; approximate lifetime of the dustbins is 12 years, but this could be improved if householders stopped the practice of burning refuse in the bins. Most trade refuse is incinerated, and the remaining trade refuse and domestic refuse is disposed of in a sanitary landfill. [Gen. 1½ pp.]

83. Garbage and Refuse Collection and Disposal in Wisconsin Cities. *The Municipality*, 57:10:254, October 1962.

Summary of a comprehensive survey of existing refuse collection and disposal practices of 141 municipalities in Wisconsin. In order to obtain the information, a six-page questionnaire was sent to all member cities of the League of Wisconsin Municipalities in 1962. Gives information pertaining to: method of collection—municipal collection, municipal contractor, licensed scavengers, private scavengers, individual removal; city collection methods—combined collection, collection agency, personnel and equipment; collection frequency—refuse and garbage; place of pickup; limits on amount, size, or type of refuse collected; disposal methods—hog-feeding, sanitary landfilling, incineration, open dumping; disposal facilities; and public attitudes toward disposal methods. [Det. 2½ pp. 1 tab.]

84. Homestead, Fla., has Reorganized Service. *Refuse Removal Journal*, 5:7:22, July 1962.

Explains refuse collection and disposal operations in Homestead, Fla. In southern Florida refuse cannot be buried, because the entire area is near sea level and any excavation quickly runs into water. Homestead first burns its refuse, and the remains are then leveled off and compacted. The process leaves the residue above sea level, and a public park may eventually be established there. Recently a new superintendent of the sanitation department was appointed. Under his direction new collection routes have been laid out to end the overlapping of service, and a very strict program of keeping equipment clean and painted has been inaugurated. [Gen. 1⅓ pp. 1 ill.]

85. Making Hong Kong a Pleasant Place to Live in. *Public Cleansing*, 52:1:30, January 1962.

Briefly describes the sanitation activities in Hong Kong, China. More than 5,500 workers are engaged in the collection and disposal of refuse and night soil, street washing, and the maintenance of public latrines and bathhouses. Almost 1,000 tons of refuse are collected daily in the city from about

1,600 collection points by various types and sizes of vehicles. Street sweeping is done by individual sweepers each of whom are assigned specific areas. There are 1,800 litter bins throughout the city in addition to each family's domestic dustbin. The urban council has investigated the use of refuse chutes in multistory buildings, but objections to this were many. [Gen. 2 pp.]

86. Mammoth Budget Is a Must for New York City. *Refuse Removal Journal*, 6:4:6, April 1963.

Outlines the organization of the New York City Sanitation Department and functions of each of the divisions. The Department consists of the Bureaus of Cleaning and Collection, Waste Disposal, Motor Equipment, and Plant Maintenance, the Division of Safety, the Training Center, and the Inspectional Force. The city is divided into 8 boroughs, 57 districts, and 234 sections for sanitation operations. Total budget of the Department is $126,000,000, and 14,000 workers are employed. [Gen. 2⅔ pp. 4 ill.]

87. Municipal Equipment "Rental." Part I. *The American City*, 77:8:77, August 1962.

Many cities today are finding centralization of municipal equipment will generally result in obtaining the greatest value out of the tax dollar. All municipal equipment, with a few exceptions, is controlled by a distinct division of the city public works department, and all municipal agencies use the equipment on a rental basis. The equipment division is, therefore, self-supporting, while the other agencies include rental costs in their annual budgets. Presents a summary of rental charges and other pertinent data for the systems in Greeley, Colo., Highland Park, Mich., and Honolulu, Hawaii. All refuse collection, disposal, and street cleaning equipment come under this centralization plan. (See item No. 88 for part II, and item No. 89 for part III.) [Det. 3 pp. 1 ill. 3 tab.]

88. Municipal Equipment "Rental." Part II. *The American City*, 77:9:116, September 1962.

Part II of a discussion of the centralization of municipal equipment. Tells how to calculate rental charges and finance equipment purchase. Describes the systems used in Louisville, Ky., and Phoenix, Ariz. (See item No. 87 for part I, and item No. 89 for part III.) [Det. 2⅔ pp. 1 ill. 2 tab.]

89. Municipal Equipment "Rental." Part III. *The American City*, 77:10:92, October 1962.

Part III of a discussion of the centralization of municipal equipment. Includes: (1) taking of passenger cars home at night; (2) identification of municipal equipment; (3) compiling of records for good equipment management; and (4) procedures to be followed in case of accident. Describes municipal equipment systems in Livermore, Calif., San Diego, Calif., and Tucson, Ariz. (See item No. 87 for part I, and item No. 88 for part II.) [Det. 2⅔ pp. 1 ill. 2 tab.]

90. New Company Offers to Provide Refuse "Package." *Refuse Removal Journal*, 5:6:30, June 1962.

Describes briefly the "total systems" concept of a recently established company which may provide an answer to communities' refuse disposal problems. The company will offer to communities, governmental authorities, and private firms a "package deal" which will include: (1) the training of personnel, assistance to a community in setting up more efficient refuse collection systems, and the design and sale of specialized refuse collection equipment and containers for more economical refuse collection; (2) the construction of a refuse conversion plant using the Naturizer process; and (3) a marketing organization for the sale of both salvage materials and conversion products. [News. 1 p.]

91. New Orleans Department Faces Special Problems. *Refuse Removal Journal*, 5:9:14, September 1962.

Describes sanitation operations in New Orleans, La. Up until 1953 New Orleans was still collecting refuse in mule-drawn open wagons, but the mule has given way to a fleet of compaction refuse trucks. Garbage is picked up three times a week, and trash once a week. Successful experimentation is being done in combined collection of garbage and trash, and this system will probably be extended in the future. Refuse disposal is accomplished through sanitary landfilling and incineration at the present, but gradually the city is shifting toward a system of total incineration. Narrow streets and parked cars present problems for street cleaning operations. The city has to employ men on foot with pushbrooms to reach some areas. Trees also create problems in New Orleans; the city has some 150,000 trees, making leaf removal a big job each fall. The annual Mardi Gras presents special litter problems for the city of New Orleans which must be coped with. [Gen. 2⅓ pp. 3 ill.]

92. Public Cleansing in Aden Municipality. *Public Cleansing*, 53:4:165, April 1963.

Briefly describes refuse collection and disposal and street cleaning in Aden Municipality, Aden. Only recently was the city's primitive and unsanitary refuse removal scheme converted into a modern and hygienic system. Aden Municipality is now using diesel refuse trucks to collect and transport refuse to the disposal site, where sanitary landfilling is the method used. A municipal dustbin scheme for the city is being investigated, but will have to be delayed due to the capital outlay involved. Street cleaning is done by gangs of laborers at present and mechanization is under review because of the increasing labor costs. Suction sweeping machines would be of considerable use in Aden with the high dust and grit content of street litter and the rough road surfaces in the city. [Gen. 4 pp.]

93. Record Collection. *Public Cleansing*, 52:3:135, March 1962.

Briefly relates three important accomplishments recently made in Birmingham, England, sanitation services. The new refuse disposal and salvage works is now in full operation, serving an estimated 231,000. The dustless refuse-collection system introduced in January 1959, continues to make progress with the addition of 14 new collection vehicles. The city's refuse collectors set a new record by collecting 8,737 tons of refuse in one week. [News. ½ p.]

94. *Refuse Study for the Capitol Region Planning Agency.* East Hartford: Capitol Region Planning Agency, February 1963. 96 pp.

Report on an intensive refuse study for the Capitol Region of Connecticut, an area in the north central part of the State encompassing 27 municipalities. Increasing land requirements for refuse disposal in the Capitol Region coupled with declining availability of vacant land for new disposal sites prompted the study. The report presents data on the following points: (1) The Capitol Region—the area which it encompasses, and its past, present and future population. (2) Refuse—per capita production, and changing living standards and discard patterns and their effect on refuse quantities and character. Defines solid wastes, refuse, garbage, rubbish, ashes, street wastes, dead animals, abandoned vehicles, industrial refuse, demolition wastes, construction wastes, special wastes, and sewage treatment residue, giving contents and sources. (3) Refuse collection in the Capitol Region. (4) Refuse disposal methods—a comparison of incineration and sanitary landfilling as to effectiveness, prevention of nuisance, consumption of land, and building and operating costs; and existing disposal practices, land consumption, and life expectancy for land volumes in the Capitol Region. (5) Refuse disposal administration—comparison of control by individual towns, subregional groups of towns, and a regional agency; and regional or subregional programs which could be developed to meet disposal needs for the Capitol Region through 1985. Makes recommendations implementing the findings of the study. [Det. 96 pp. 1 diag. 4 gr. 2 map. 1 dr. 28 tab.]

95. Rural Problems. *Public Cleansing*, 52:6:274, June 1962.

Extracts from an address by Mr. R. H. T. Chappell, senior public health inspector to the Hemel Hempstead Rural District Council on problems of the collection and disposal of waste materials in rural districts. Points out that a refuse collector views his work in terms of bins emptied, rural collectors are impossible to strictly supervise, and that suitable rural collectors are not possible to obtain at standard wages. Contends that an incentive scheme must therefore be applied. Also claims that the only practical method of refuse disposal in rural areas is sanitary landfilling. Briefly discusses the problems of industrial waste and water pollution in rural areas. [Ext. 1¼ pp.]

96. Six New Trucks Expand Refuse Fleet in Newark. *Refuse Removal Journal*, 6:5:6, May 1963.

A brief discussion of refuse collection and disposal and street sweeping in Newark, N.J., touching on the main points of these services. The city recently added 6 new packer trucks to its collection fleet, which now consists of 50 packers and 15 open-bodied trucks. The fleet collects 600 tons of refuse daily from the backyards of residences, and each vehicle of the fleet has a three-man crew. Eighteen power sweepers and three flushers clean the city's 372 miles of paved streets. Refuse disposal is no problem in Newark; the city borders a vast area of swampy flatland which can be used as a disposal site. [Gen. 1⅔ pp. 2 ill.]

97. A Small Town's Problems and Progress. *Public Cleansing*, 52:4:159, April 1962.

Extracts from a report on the Dudley, England, public cleansing and transport services, discussing the town's problems and progress. The loss of man-days through absenteeism, sickness, and holidays is a major problem which the town is attempting to solve by introducing an incentive bonus scheme. Dudley now operates a dustless collection system, and disposal is accomplished by incineration and sanitary landfilling. Income from salvage recovery does not totally cover the net cost of disposal, although the cost is reduced. [Ext. 1 p.]

98. The Sunderland Story. *Public Cleansing*, 53:11:536, November 1963.

A discussion of refuse collection and disposal services in Sunderland, England. The city recently decided to abolish the use of skeps and introduce a municipal bin scheme. The value of the issue of protective clothing to all employees is evidenced by the fact that a once-weekly frequency of refuse collection was maintained throughout the most severe winter. The increase in the volume of material for refuse collection has been met by the acquisition of larger capacity refuse collection vehicles. Changes will be necessary in the next few years because of the cessation of controlled tipping in the area at present used, and an extensive investigation into alternative methods of disposal has been pursued. City officials report no significant increase in refuse weight, but a steady increase in bulk. This is contrary to the experience of those authorities which weigh more than 80 percent of their refuse. Sunderland might find the same to be true if the preponderance of its refuse were in fact weighed. The city makes every effort to meet the needs of industrial and commercial requirements for the removal of trade refuse to encourage the movement of industry to the area. [Gen. 3 pp.]

99. Wanted: New Ideas on Waste Treatment. *Compost Science*, 3:2:46, Summer 1962.

New ideas are being sought for handling the mountains of waste, garbage, and rubbish that are created in American communities. Refuse collection and disposal alone costs over $1.5 billion annually in the United States, ranking third behind schools and roads in community expenditures. But almost all the money spent on solid waste disposal is used for equipment and operation; almost none of it is going into research and development of better methods. Congress has been asked to authorize the expenditure of up to $1,000,000 for research and technical assistance to help cities overcome the tremendous problem of getting rid of increasing quantities of solid wastes. [News. ⅓ p.]

Ayers, F. E.

100. PRESENT STATUS AND TRENDS IN REFUSE COLLECTION PRACTICE. *Canadian Municipal Utilities.* 101:12:26, December 1963.

A very general look at the present status of, and trends in refuse collection and disposal; with emphasis upon collection. Briefly touches upon the following: changing factors which have forced municipalities to experiment with a variety of methods to meet the refuse problem; critical examination and updating of refuse regulations; importance of the public attitude and cooperation in the refuse collection service; the effect of the use of proper containers upon collection costs; experiments with the use of polyethylene-lined garbage cans and light plastic collection barrels mounted on rubber wheels; the increase in the use of portable bulk containers for large establishments; trends in collection equipment away from the ordinary open-bodied dump trucks toward the enclosed packer bodies; the residential incinerator program; the trend toward refuse collection by contract, and advantages and disadvantages of this system; and refuse disposal by sanitary landfilling, incineration, and composting. [Gen. 2 pp.]

Barton, Alan E.

101. PRESIDENTIAL ADDRESS. *65th Annual Conference of the Institute of Public Cleansing.* June 17–21, 1963.

Discusses very generally and briefly the advancements which have been made in refuse collection and disposal and street cleaning since the founding of the Institute of Public Cleansing 65 years ago. Also describes the establishment of the Institute and its early years of existence, and pays tribute to the men responsible for the advancement of sanitation services. [Gen. 5½ pp.]

Bell, John M.

102. THE PHYSICAL AND CHEMICAL COMPOSITION OF MUNICIPAL REFUSE. *The APWA Reporter.* 29:1:11, January 1962.

Emphasizes the importance of knowing both refuse quantity and quality in determining the most efficient refuse collection and disposal system for a particular area. Describes the research project entitled, "The Physical and Chemical Composition of Municipal Refuse," being conducted at Purdue University. The project consists of three phases: (1) development of sampling and analysis methods; (2) study of the physical and chemical composition of refuse produced in a number of cities; and (3) statistical analysis and evaluation of the data in terms of its applicability on a nationwide basis. (See items No. 112, 212.) [Gen. 1¼ pp.]

Black, Ralph J.

103. SOLID WASTES HANDLING IN URBAN AREAS. *Transactions of the Thirteenth Annual Conference on Sanitary Engineering,* p. 13.

The storage, collection, and disposal of solid wastes is one of the major problems of urban areas today, evidenced by the enormous annual outlay for these services in the United States and the public health concern with the solid waste handling. The report briefly discusses fly production, air pollution, and occupational health hazards related to solid waste handling, and cites several studies and references for further research into the problem. [Gen. 2 pp. 11 ref.]

Black, Ralph J.; and Steed, Henry C., Jr.

104. SOLID WASTES RESEARCH IN THE UNITED STATES. *65th Annual Conference of the Institute of Public Cleansing,* June 17–21, 1963.

A survey of current or recently completed solid wastes research in the United States. Lists 10 research projects which have been awarded by the United States Public Health Service, giving the title of the project, the name of the principal investigator, the institution, and a brief description of the scope of the work. The research projects include: sanitary aspects of composted sewage sludge; garbage and wastes for mushroom production; the physical and chemical composition of municipal refuse; bacterial contamination from hospital solid wastes; sanitary landfill investigation; sanitary engineering applied to livestock manures; incineration of automobile bodies and bulky waste materials; factors controlling utilization of sanitary landfill site; aerobic decomposition of organic waste materials; and mathematical simulation of refuse collection and disposal systems. Also lists other activities in solid wastes research being conducted by a variety of organizations throughout the United States, including the American Public Works Association; the American Public Works Association Research Foundation; the Armour Research Foundation, Illinois Institute of Technology; the California State Water Pollution Control Board; Engineering-Science, Inc.; the Bureau of Vector Control, California State Health Department; the National Canners' Association; and the National Sanitation Foundation of Ann Arbor, Mich. [Det. 8 pp. 15 ref.]

Booth, Edward J.

105. RESULTS OF APPLYING THESE IDEAS IN MY CITY. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal,* p. 46, April 1963

A description of refuse collection and disposal in Bismarck, N. Dak. The present-day collection service was begun in 1948 with the adoption of a garbage ordinance and the purchase of three modern packers. The city serves all the residential areas for a fee of $1.25 per single-family dwelling and $0.75 for each additional kitchen in the case of apartments; a private licensed collector serves the commercial area. Following a study of refuse disposal by the sanitary landfill method in northern regions, the city converted its refuse dump into a sanitary landfill site in 1951 employing the area and ramp methods in its operation. Appendices give the Bismarck garbage ordinances the financial statement for 1961–62, the report on a survey of the condition of garbage containers in the city, and a sample form used in the survey. [Det. 11 pp. 2 tab.]

Bowes, William A.

106. Portland, Oreg., Relies on Private Contractors. *Refuse Removal Journal*, 5:3:20, March 1962.

Refuse collection in the city of Portland, Oreg., is handled by licensed private refuse haulers, and most of the refuse is disposed of in the city-owned sanitary landfill. At the present there are 237 licensed refuse trucks operating in the city, each with an annual license fee of $550. Collectors in fringe areas operating both in and out of the city must pay a license fee of $800 per truck. Residential refuse collections are generally made once a week, and the common price charged by collectors is $1.50 per month for each 30-gallon refuse can. Approximately 90 percent of the refuse is handled at the city's sanitary landfill, located in a low, swampy area 10 miles from the center of the city. Only those items which must be burned are disposed of in the municipal incinerator due to the high cost of incineration. [Gen. 1½ pp. 3 ill.]

Bremser, L. W.

107. What the Consulting Engineer Can Do for You. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 40, April 1963.

Describes some of the services a consulting engineer can supply to a municipality in planning its refuse collections and disposal system. An experienced consulting engineer can: (1) evaluate the various proposals with which a municipality is faced and separate those with merit from those which have no value; (2) collect the detailed data needed for a refuse collection and disposal study or direct its collection by municipal personnel; (3) settle local controversies by unbiased evaluation of facts and costs; (4) analyze municipal records and determine the true cost of an operation; (5) deal with the design and cost of allied factors which may be involved; (6) evaluate elements of local operation in the light of first-hand experience of what other municipalities are doing; and (7) help in attracting good bond buyers, if the firm is qualified in feasibility studies. Also discusses what a municipality can do for itself in planning a refuse service: it can keep records on the quantities of materials for which disposal must be provided, the composition of the refuse, and the unit weight of refuse hauled. [Gen. 3½ pp.]

Bugher, Robert D.

108. *Solid Wastes Research Needs.* American Public Works Association Research Foundation Project No. 113. Chicago: American Public Works Association, May 1962. 80 pp.

A report of an investigation undertaken to determine research needs in the field of solid waste collection and disposal. Considers separately each of the following phases of the subject: (1) reducing quantities of solid wastes; (2) refuse disposal at the point of origin; (3) refuse storage; (4) refuse collection; and (5) central refuse disposal—landfilling, incineration, composting, and general methods. Each chapter, which deals with one of these areas, contains a brief discussion of the problems associated with that function, and some of the shortcomings of present methods of dealing with those problems. Each discussion is followed by a series of proposed research projects which includes the title and an explanation of the project. An appendix gives a detailed sample research project, entitled "Analysis of Solid Waste Collection Systems." [Det. 80 pp. 14 ref.]

Cheek, Fred R.

109. Study Shows Varied Refuse Systems. *The APWA Reporter*, 30:6:4, June 1963.

An excerpt from an article appearing in the April 1963 issue of the *Regional Reporter*, published by the Detroit Metropolitan Area Regional Planning Commission. In March of 1962 the Commission commenced a study of the refuse collection and disposal practices of 178 communities in the 5-county area. The questionnaires showed a bewildering variety of collection and disposal systems. Fourteen of the communities had no system at all, and 105 communities disposed of at least part of their refuse in other communities. Ninety-seven indicated that they favored establishment of some kind of consolidated refuse program. [Ext. ½ p.]

Coates, V. Aylmer

110. New Land for Old. *65th Annual Conference of the Institute of Public Cleansing*. June 17–21, 1963.

Précis of an address presented by the author. Briefly discusses the derelict land in Lancashire County brought about by the extra-active industries and new buildings and installations. Recognizes the fact that every acre of the derelict land which can be reclaimed to beneficial use is a valuable national asset and saves an acre of agricultural land elsewhere. It is in situations like these that the possibility of schemes for regional disposal of industrial and domestic refuse should be considered. [Gen. 2½ pp.]

Davies, A. G.

111. Future Trends in Waste Storage and Disposal. *Royal Society of Health Journal*, 82:6:289, November-December 1962.

A general discussion of refuse storage and disposal covering the following: (1) influencial factors in disposal; (2) alleviation of the problem at the source—disposal via the sink waste unit, and incineration at the source; (3) storage before removal—the paper sack, and the plastic bin; (4) the problem of disposal—land reclamation, disposal by incineration, pulverizing, and composting; and (5) future trends. Discussion follows the report. [Gen. 7 pp. 6 ill.]

Etzel, James E.; and Bell, John M.

112. Methods of Sampling and Analyzing Refuse. *The APWA Reporter*, 29:11:2, November 1962.

Report on a study on methods of sampling and analyzing refuse initiated by the APWA American Public Works Association Research Foundation as Project No. 103 in September 1957. The study consists of three phases: (1) development of sampling and analysis methods for municipal refuse; (2) study of the physical and chemical composition of refuse produced in a number of cities; and (3) statistical analysis of the data obtained in phase 2 in terms of its applicability on a nationwide basis. In the field studies, refuse was sampled from Milwaukee, Wis., Toledo, Ohio, and Bloomington and Indianapolis, Ind. An inverse logarithmic relationship was found between the sampling ratio and the average percent sampling error. Significant differences in the amount of refuse generated per capita per day were found between high, medium and low socioeconomic sampling areas, as well as between the various seasons of the year. In the laboratory studies, the errors due to the shredding of the refuse and the drying and grinding of the refuse (two necessary stages in the preparation of the refuse for chemical analysis) were found, and empirical formulas for the determination of the percent of carbon and hydrogen in various components of refuse were formulated. Criteria for selection of the sampling areas, collection schedules and procedures, segregation procedures, preparation of samples for laboratory analyses, and methods of laboratory analyses are discussed. (See items Nos. 102, 212.) [Tech. 6 pp. 3 ill. 3 tab. 2 ref.]

Fisher, Frederick E.

113. Booklet Prepares Pa. Community for New Refuse Program. *Refuse Removal Journal*, 6:10:6, October 1963.

Grove City, Pa., has recently revamped its formerly inefficient and unsanitary refuse removal system. Under the old system, refuse was collected by private contract, but no provisions were made for the type of collection vehicles to be used or the kinds of refuse to be collected. Also, refuse was deposited in an open dump within municipal limits which was unsanitary and a public nuisance. In an effort to improve conditions, a borough council drafted specifications for a new, comprehensive residential refuse collection and disposal program, contracted with the lowest bidder for the prescribed refuse removal job, and published a booklet to prepare the residents for the new program. This booklet is reproduced in the article. [Gen. 3 pp. 4 ill.]

Gordon, Mitchell

114. "The City Dump" (Ch. 10). *Sick Cities*. New York: The MacMillan Co., 1963. 366 pp.

A chapter of the book is devoted to the refuse problem faced by American cities today. Presents a good summary of the extent of the problem and trends in the field of refuse handling. Includes sanitary landfilling, open dumping, hog feeding, efforts to ease the refuse collection burden, the Garchey system of refuse collection, garbage grinding, composting, salvaging, and incineration. [Gen. 18 pp.]

Greene, V. W.; Vesley D.; Bond, P G.; and Michaelsen, G. S.

115. Microbiological Contamination of Hospital Air—Part I. Quantitative Studies. *Applied Microbiology*, 10:6:568, November 1962.

The levels of airborne contamination in various areas of two hospitals were determined during a 15-month sampling period, using Casella and Anderson volumetric samplers. Based on nearly 5,000 samples, the mean count per cubic foot ranged from 4.5 in obstetric-gynecology delivery rooms to 72.4 in waste-handling areas. The mean count for the entire hospital environment was on the order of 20 contaminants per cubic foot; 48 percent were associated with particles greater than 5 micron diameter, 30 percent with particles between 2 and 6 micron diameter, and 22 percent with particles less than 2 micron diameter. The airborne contamination was influenced by traffic, activity, ventilation considerations, and gross surface contamination, but not markedly by seasonal changes. When suitable control measures were implemented, the level of contamination could be diminished and kept low. [Det. 5 pp. 3 gr. 6 tab. 14 ref.]

116. Microbiological Contamination of Hospital Air—Part II. Qualitative Studies. *Applied Microbiology*, 10:6:567, November 1962.

Over 10,000 airborne microorganisms isolated from various areas of 2 hospitals, were characterized according to colonial and microscopic morphology and certain physiological reactions, including penicillin resistance and hemolysis. On the basis of all isolates examined during a 15-month period, 42.6 percent were gram-positive cocci, 19.2 percent were gram-positive rods, 14 percent were gram-negative rods, 17.1 percent were molds, 2.2 percent were actinomycetes, 1.2 percent were yeasts, and the remainder were assorted diphtheroids and coccobacillary types. The distribution of types varied according to hospital area, locations within a given area, and level of gross airborne contamination, but did not vary significantly with season of the year. There appeared to be some relationship between contaminant particle size and type of organism associated with the particle. Distribution of penicillin-resistant types differed markedly in different hospital areas, with proportions ranging from 21.4 percent in surgery areas to 4.3 percent in incinerator rooms. Of all gram-positive cocci isolated, 34.9 percent were hemolytic and 16.4 percent were penicillin-resistant. [Det. 5 pp. 1 diag. 6 tab. 11 ref.]

Guilday, John E.

117. Refuse and the Archaeologist. *Compost Science*. 3:3:20, Autumn 1962.

"Cultural debris" has sustained, nourished, and actually brought into being the relatively modern science of archaeology. This is so because the basic materials with which an archaeologist works are tangible traces man has left behind; and he has left behind more rubbish than any other material. The article describes how discarded stone and pottery fragments, bones, corn, beans, basketry, cloth, wood, pollen grains, teeth, fish scales, antlers, and other items are used by the archaeologist to study prehistoric life. [Gen. 2 pp. 2 ill.]

Hawaii University, Honolulu. Department of Public Health.

118. *A Report of Progress on the Status of the Solid Waste Program for Oahu.* Honolulu: University of Hawaii, Department of Public Health, June 1963. 106 pp.

A comprehensive progress report presenting the information gathered in a study of solid waste problems on Oahu Island, Hawaii, and the recommendations formulated on the basis of these findings. Includes the following: Methods used in compiling and evaluating information; local regulations concerning the collection and disposal of solid waste; organization of the refuse division; description of refuse presently collected—quantity, classification, and characteristics; collection of solid waste—operations, and costs; disposal of solid waste—disposal sites, a summary of land disposal-site information, and incinerator operations; alternate disposal methods—sanitary landfilling, composting, ocean disposal, hog feeding, salvage and reclamation, and miscellaneous methods; present cost comparisons—disposal cost, total disposal and collection costs, and per capita costs; discussion; bibliography; summary of present status of the solid waste program for the city and county of Honolulu; recommendations for consideration; and two appendices presenting completed questionnaires and listing former disposal sites. [Det. 106 pp. 33 ill. 12 tab. 3 diag. 3 maps. 23 ref.]

Henderson, R.

119. The Nature of Records Required to be Kept by a Cleansing Department for Costing and Statistical Purposes. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

The degree of success achieved by any business or service is directly related to the extent of its knowledge of its own organization, of the activities of other similar undertakings, and of the requirements of the public which it serves. The source of much of this knowledge is the records kept by the organization; care must therefore be taken to insure that all essential information is recorded and that the figures are available in suitable form at the right time. The article discusses record keeping and costing, with emphasis upon those practices which concern the sanitation department. Includes the following: presentation of records and statistics; records involving communications and public relations; personnel records; labor turnover records; absence, sickness, and accident records; recording of refuse collection, refuse disposal, and street cleaning activities; costing—in labor, transport, maintenance workshops, and stores; depot expenses; administration expenses; revenue; and sampling. [Gen. 19 pp. 3 gr. 5 ref.]

Hopkins, R. R.

120. The Recruitment and Retention of Labour. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

A general discussion of the recruitment and retention of labor, with emphasis upon unskilled labor and in reference to current conditions (e.g., full employment). Includes: attraction of labor; recruiting; initiation and probation; long-term retention; tangible employee benefits; and climatic or non-tangible incentives. [Gen. 7 pp.]

Johnson, Worth

121. 41 Years of Refuse Collection in Long Beach. *Western City*. 37:5:34, May 1962.

Gives details of refuse collection and disposal in Long Beach, Calif., and all pertinent statistics relating to these services. Consolidated combustible and noncombustible rubbish and garbage (food waste) are collected separately. A charge is tacked onto the gas and water bill for rubbish collection, while the collection of garbage is a tax-paid municipal problem. Garbage is collected once a week and is sold to a hog feeding contractor, with the price scaled to the average weekly price of pork. Rubbish is collected twice weekly in congested residential areas, once weekly in noncongested residential areas, and daily in commercial districts, and is disposed of by contract in two privately owned disposal sites. Forty pecent of the homes in the city are now equipped with food waste disposers, resulting in a 53-percent decrease in amount of garbage collected from 1951 to 1961. The article gives statistics on population and area of the city, number of dwellings and businesses, rubbish collection charges, refuse trucks used, amount of garbage and rubbish collected, prices of garbage sold, collectors' salaries, and collection and disposal costs. [Det. 1½ pp. 3 ill.]

Lobb, Everett

122. "Love That Garbage." *League of North Dakota Municipalities Bulletin*. 31:8:8, August 1963.

In some of the towns in North Dakota the system of refuse collection and disposal is inadequate and unsanitary. It is important that storage, collection, and disposal of refuse be recognized as an essential safeguard for public health and comfort. The article briefly discusses: the sanitary method of refuse storage, who provides the collection service, collection trucks used, and sanitary landfilling in North Dakota. Also tells how one small town (of 1,000 population) in the state improved its refuse collection and disposal service. [Gen. 1⅔ pp. 3 ill.]

McGahan, Clifford A.

123. Collections Were More Than Doubled. *The American City*, 77:8:31, August 1962.

Briefly touches upon the main features and facts about the municipal refuse collection and disposal service in Zanesville, Ohio. The adoption of free refuse collection and the passing of an ordinance prohibiting open burning has more than doubled the number of weekly collections and has prompted the city to hire 12 additional employees and to purchase a new 16-yard packer. [News. ⅔ p.]

McSpadden, William C.

124. Superintendent Writes of System in Phoenix. *Refuse Removal Journal*, 5:5:18, May 1962.

Describes sanitation activities in Phoenix, Ariz. The city is responsible for the collection of residential garbage and trash, the disposal of refuse by sanitary landfilling, the sweeping of streets, and the maintenance of storm sewers. Refuse collections are made twice weekly by three-man crews consisting of two loaders and a driver. Twenty-cubic yard, rear-loading compaction trucks with automatic transmissions and auxiliary-powered packing and dumping mechanisms are used. Brush collections are made every other week, using 24-cubic-yard side loading packers, 20-cubic-yard trailers, and chipping units. There are three landfills available to residents and commercial firms, and a refuse processing plant has recently been completed for refuse disposal. Three-wheel sweepers are used exclusively in the city's street cleaning activity. Local streets are swept weekly; collector and arterial streets are swept twice a week. [Gen. 1½ pp. 2 ill.]

Nair, V. R.

125. Cleansing in Malaya. *Public Cleansing*, 53:10:481, October 1963.

A description of refuse collection and disposal practices in Malaya by the Chief Public Health Inspector of that country. Includes the organizations responsible for the refuse services, the type of refuse generated in Malaya, storage and collection, disposal of refuse, labor for the refuse services, and maintenance of vehicles. [Gen. 3½ pp.]

Nasi, Kaarlo W.

126. Duties and Responsibilities of the Administrator in the Collection and Disposal of Solid Wastes. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 12, April 1963.

Defines an "administrator," and discusses the duties and responsibilities of the administration in solid waste collection and disposal. Divides these duties into seven categories: (1) the development of local laws, or recommendations of amendments to existing laws to improve the refuse service (lists usual contents of such ordinances), (2) planning of the service for maximum effectiveness and economy, (lists factors which should be considered); (3) financing (briefly states results of a survey of United States cities on methods of financing refuse systems); (4) development and maintenance of the organization to perform the operation (lists basic management principles for this duty); (5) personnel management (presents basic standards in this responsibility); (6) public relations; and (7) fiscal management, including records of operations, time and motion studies, cost data, and budget control. [Gen. 6 pp. 2 ref.]

Newcomb, Jack

127. Boise-Ada County, Idaho, Uses Contract System. *Refuse Removal Journal*, 5:6:16, June 1962.

An account of refuse collection and disposal procedures in Boise, Idaho. Collection is accomplished by private contract. Residents may either use the services supplied by area hauling companies, or they may haul the refuse themselves, but everyone must prescribe to the standards set down by the city. Refuse is disposed of in four county refuse areas. The contractors must furnish trenches for dumping and maintain the areas in a sanitary and satisfactory condition. [Gen. 2 pp. 1 ill.]

Novick, Robert E.

128. Refuse Disposal—A National Problem. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 4, April 1963.

Discusses three reasons why solid waste disposal is a problem today: (1) public health—unattended solid wastes attract vectors; (2) aesthetic—the unattended or unsatisfactorily disposed wastes become eyesores; and (3) economical—the national bill for refuse removal totals $2.8 billion annually. Talks about: refuse composition; methods of refuse collection, giving the percentages of municipalities using municipal, municipal contract, and private systems; refuse disposal, giving the percentages of communities using open dumps and sanitary landfills and citing the disadvantages of incineration; and the local governments taking the burden of the responsibilities for refuse collection and disposal. Also, lists needs, in research and administration, which must be satisfied in order to improve refuse collection and disposal practices. The most apparent needs are to apply the knowledge and abilities already available to refuse handling operations, and to nurture and develop a much stronger comprehensive research effort. [Gen. 7 pp. 6 ref.]

Olds, Jerome

129. Solid Wastes Research and Environmental Health. *Compost Science*, 3:2:35, Summer 1962.

According to the American Public Works Association, the annual outlay for refuse collection and disposal services is over $1.5 billion, exceeded only by expenditures for schools and roads. Practically all of this money is spent on equipment and operations, with extremely small amounts going for research. Because of this critical situation, the APWA prepared a report outlining specific research projects in the field of solid waste storage, collection, and disposal methods, entitled "Solid Wastes Research Needs." The article gives some of the extremely valuable comments in this report. Among the list of areas in which research is needed are: new uses for existing wastes; improvements in salvaging procedures; methods of analysis of refuse and compost; comparative data on the quality and quantity of refuse produced in representative cities in different parts of the country; development of an onsite refuse composting unit; potential market value and relative merits of refuse composting; development of methods to accelerate the compost process and to improve the usefulness and quality of the end product; and minimum requirements for bulk storage of compost. Also quotes a section of the publication "100 Problems in Environmental Health," entitled "What is the Value of Refuse Compost in Agriculture and Horticulture?" [Gen. 2½ pp.]

Peters, Richard F.

130. Urbanization's Impact on the Poultry Industry. *California Vector Views*, 10:11:69, November 1962.

Examines the fly problem in California, stemming not only from the wastes of the poultry industry, but also from wastes and refuse of the whole community. Lists three important fly species which propagate prolifically within the byproducts and wastes of the poultry industry and the community. The flies are inevitably attracted to food and shelter in the homes and backyards of the nearby residential areas where they create a severe nuisance. Man is in jeopardy of some day being submerged by his own wastes in the absence of positive planning to meet this growing dilemma. Comprehensive facing up to the need for organic wastes management is essential; the longer this subject is regarded passively, the greater will become the fly problem, the need for a remedy, and the ultimate cost of the remedy. The poultry industry, instead of reacting defensively to accusations of poor waste management, should take positive steps to alleviate the problem by actively participating in the development of a fly control program, in reality an organic wastes management program, wherever flies are a chronic problem. [Gen. 2½ pp.]

Pollock, Eugene L.

131. Refuse Removal and Disposal. *1963 Sanitation Industry Yearbook*, p. 8.

An introduction to the *Sanitation Industry Yearbook*, discussing refuse collection and disposal in general. Discusses briefly: the items embraced under the term "refuse," the types of packer vehicles; the classifications of refuse collection; bulk storage; variations in the volume and nature of refuse produced; the transfer station; incineration; composting; the national bill for refuse removal; contract refuse collection; refuse collection personnel; bulky refuse; and preparation of refuse for collection. [Gen. 3 pp.]

Rinehart, John

132. A City Dumps Its Dumpsite. *Public Works*, 93:3:117, March 1962.

Tells how the town of Logansport, Ind., decided upon changing its intolerable refuse dump into a sanitary landfill operation and the steps taken in accomplishing this task. Refuse collection and disposal had previously cost the town $89,000 annually. However, bids for the service were opened, and a contract has now been signed between the town and a private contractor who will provide the service for $59,855. [Gen. 1½ pp. 1 ill.]

Roberts, F.

133. Career Opportunities in the Public Cleansing Service. *65th Annual Conference of the Institute of Public Cleansing*, June 17–21, 1963.

Purpose of this paper is "to highlight the present training schemes in operation and to signpost the method of entry into the executive grades of the Public Cleansing Service with particular reference to the advantages of the pupil-trainee scheme." Discusses the recruitment of suitable staff for training for executive positions, organization of departments, facilities for training, recommended periods of training, overseas students, training of supervisory staff, and careers available to the fully trained. [Gen. 13 pp.]

Rogus, Casimir A.

134. The Collection and Disposal of Solid Wastes in U.S.A. *The APWA Reporter*, 30:3:10, March 1963.

A broad discussion of the basic elements and problems of refuse collection and disposal in the United States. Includes: the major components, by weight, of municipal refuse; amount of refuse generated today; the basic considerations in the planning of refuse collection systems—financing, municipal versus contract versus private collections, frequency, source of refuse, point of pickup, collection vehicles, and containers; and the several alternate methods of refuse disposal—piggeries, grinding, domestic incineration, composting, sanitary landfilling, and municipal incineration. [Gen. 3¼ pp.]

135. The Solid Waste Problem. *Proceedings of the First Conference on Environmental Engineering and Metropolitan Planning*, p. 129. John A. Logan, Paul Opermann, Norman E. Tucker, editors. Evanston: Northwestern University Press 1962. 265 pp.

Discusses very briefly and generally: the term "refuse" and what it applies to; refuse quantities and composition; refuse collection—financing, type of collection system (municipal, contract, or private).

frequency, source of refuse, point of pickup, collection vehicles, and containers; refuse disposal—piggeries, grinding, domestic incineration, composting, sanitary landfilling, and municipal incineration; and street cleaning. A comment, discussion and a workshop follow the report. [Gen. 9½ pp.]

Smith, D. H.

136. Operation Bootstrap. *The American City*, 78:7:78, July 1963.

Describes how the city of Beaumont, Tex., has built up its sanitation department equipment and operating facilities for a minimum outlay. The key part of the program was the purchase of 250 acres of partially inundated wasteland along the Neches River and establishment of a sanitary landfill there. Much care is taken in keeping the landfill operations sanitary, because the site is located only a few blocks from downtown Beaumont. This city constructed sanitation facilities on the wasteland that was reclaimed. Facilities include: a service station; a vehicle-repair garage; lunchroom, toilet, bathhouse, and locker room facilities for employees; and a wash rack for equipment. These facilities were constructed by department personnel from salvaged materials at a minimum cost. The city also replaced its entire fleet of obsolete, open-bed refuse trucks with 24 new compaction units. [Det. 3 pp. 4 ill.]

Stephen, John

137. Twentieth-Century Public Cleansing. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

Contends that the field of public sanitation has generally lagged behind other fields in the face of man's many outstanding achievements of the past few centuries. Discusses the field of public sanitation as it exists today. Includes the following: (1) the characteristics of town refuse—classification of refuse, factors influencing the variations in town refuse, the average composition of refuse; (2) household storage of refuse—in apartment buildings and in individual houses (the apartment bin, refuse chute, Garchey system, food grinder, the galvanized dustbin, substitutes for the galvanized dustbin; (3) the provision and maintenance of dustbins; (4) methods of dustbin emptying—the "general," skep, curbside, dustbin exchange, dustbin interchange, dustless methods; (5) collection and transportation of refuse—quantity of refuse collected, frequency of collection, location of the dustbin, length of haul, choice of vehicles; (6) disposal of refuse; (7) street cleaning; (8) snow clearance; (9) organization and administration; (10) future aims and objectives; and (11) the economic factor. [Det. 19 pp. 1 tab.]

Stirrup, F. L.

138. Public Cleansing and Housing Development. Part II. *Housing*, 25:2:45, September 1963.

Discusses the following: length of carry of the dustbin from residence to collection trucks; means of access to the dustbin; length of haul to disposal points; layout of the dustbin site; disposal of personal matter; forms of onsite disposal; and departmental responsibilities. (See item No. 68 for part I.) [Gen. 3½ pp.]

Vargas, David J.

139. Research Needed on Solid Waste. *Public Cleansing*, 52:9:421, September 1962.

Reprint. (See item No. 140.) [Gen. 5 pp.]

140. Solid Waste Research Needs. *The APWA Reporter*, 29:5:7, May 1962.

Gives the background and a summary of *Solid Wastes Research Needs*, a study recently completed for the United States Public Health Service by the Research Foundation of the American Public Works Association. A series of five APWA-sponsored meetings were held for the purpose of obtaining ideas for solid wastes research. Ideas obtained from discussions at these meetings were recorded, transcribed, and edited for inclusion in the report. The study covers these areas: reducing waste quantities; onsite disposal; refuse storage; refuse collection; and central disposal. (See item No. 139.) [Gen. 2¼ pp. 1 ill.]

Walton, Charles

141. Laramie's Experience With Garbage and Refuse Collection. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 30, April 1963.

A detailed analysis by the city health officer of the history of and the present-day operations of refuse collection and disposal in Laramie, Wyo. Describes the refuse collection system now in use, the vector control project carried out in 1957 to improve sanitary conditions, cleanup programs in the city, and the city's modified burning dump. Appendices give: (1) garbage service statistics for Laramie, Cheyenne, and Casper, Wyo., and Fort Collins and Loveland, Colo., including type of service, charge for services, number of employees, number of vehicles, type of dump, charges at dump, and fees paid by private haulers; (2) garbage ordinances of Laramie and Casper; and (3) residential garbage rates in Cheyenne. [Det. 19⅔ pp.]

Wersan, S. J.; Quon, J. E.; and Charnes, A.

142. Systems Analysis of Refuse Collection. *1962 American Public Works Association Yearbook*, p. 195.

An introduction to "Systems Analysis of Refuse Collection and Disposal Practices," a study presently being undertaken by the authors cited. Sets forth the proposition that systems of solid waste collection and disposal consist of intricately related subsystems of collection, transport, and disposal methods, and numerous local idiosyncrasies. Draws attention to the inadequacy of conventional methods of "cost competitive" analysis for designing the components of such a complex system.

Contends that modern methods of systems analysis based on the mathematical models of linear and non-linear programing are adequate for this purpose, and, in addition, yield information not otherwise available. Includes an illustrative problem in disposal site location, preliminary considerations on an internal routing problem, and two appendices. (See item No. 143.) [Det. 16⅔ pp. 8 diag.]

143. Systems Analysis of Refuse Collection. *Refuse Removal Journal*, 6:1:23, January 1963.

Reprint. (See item No. 142) [Gen. 2¼ pp.]

Wiley, John

144. Solid Waste Problem in Metropolitan Areas. *Western City*, 39:8:40, August 1963.

Reprint. (See items Nos. 145, 146). [Gen. 4½ pp. 3 ill.]

145. Solid Waste Problems in Metropolitan Areas. *Texas Town and City*, 50:30:12, March 1963.

A general discussion of problems involved in refuse storage, collection, and disposal in metropolitan areas. Includes: the two major storage problems—insects and rodents; frequency, method, and equipment of refuse collection; the use of transfer stations; and the three acceptable methods in existence for the disposal of combined refuse—sanitary landfilling, incineration, and composting. (See items Nos. 144, 146). [Gen. 4½ pp. 3 ill.]

146. Solid Waste Problems in Metropolitan Areas. *Compost Science*, 4:2:21, Summer, 1963.

Reprint. (See items Nos. 144, 145.) [Gen. 4½ pp. 3 ill.]

Wood, Norton

147. Realistic Approach Solves Refuse Problems. *Public Works*, 93:8:94, August 1962.

Describes how a hired professional refuse consultant solved many of the refuse collection and disposal problems in the county of Santa Barbara, Calif. The consultant's new refuse program included: (1) securing the cooperation of the refuse haulers in investing in better equipment and eliminating overlapping routes; (2) introducing a ramp method at the county landfill, thereby prolonging its life 5 years; (3) closing the wildcat dumps; (4) initiating a litter program; (5) drafting an ordinance for the regulation and disposal of refuse; and (6) establishing a schedule of fees for the use of landfill sites, a license fee for refuse haulers, and collection fees for residences. Includes two diagrams of the county landfill site. [Gen. 1⅓ pp. 2 diag.]

Zemlansky, John

148. Age Old Refuse Problems. *The APWA Reporter*, 29:7:10, July 1962.

Points out that the problem of collection and disposal of refuse has been with man from the beginning of communal living, and that it is becoming more acute with advancing civilization. The problem of establishment of adequate refuse removal facilities where there is no refuse collection service and open burning dumps are tolerated. Many still consider it "rubbish" to spend tax money on efficient and sanitary refuse disposal and still demand that disposal areas be located outside city limits. [Gen. 1 p.]

E. COLLECTION—Equipment

Anonymous

149. Alert Baltimore Hauler Uses Stationary Packer. *Refuse Removal Journal*, 6:2:20, February 1963.

A Baltimore, Md., refuse contracting firm has put into operation a new stationary packer refuse storage and handling system, a hydraulic compaction unit which pushes the material into a specially designed container. With the first installation, the firm was able to replace three 30-yard containers with the new unit plus one container, producing a savings in space, handling, and transport of the material. The article describes the operation of the new compaction unit. [Gen. 2 pp. 3 ill.]

150. Automatic Truck Transmissions Help City Save. *Refuse Removal Journal*, 5:1:14, January 1962.

Almost one-fourth of the city's truck fleet including sanitation trucks, in Minneapolis, Minn., is now equipped with automatic transmissions. City officials have found replacement of standard transmissions with automatic transmissions has reduced maintenance and repair costs to where the city is saving $600 annually for each vehicle. [News. ¼ p.]

151. Bureau of Motor Equipment. *Sweep*, 5:1:4, Spring 1963.

Explains the activities of the New York City Bureau of Motor Equipment. The Bureau services 4,300 pieces of equipment, including refuse-collection trucks, street cleaning machines, flushers, leaf-loaders, utility trucks, snow-removal equipment, maintenance vehicles, passenger cars, and earth-moving machines. About 15 percent of the total fleet is always undergoing preventive maintenance or repair. In addition to this, fueling of equipment is done by the Bureau. A new $18 million central repair shop is now under construction which will be able to service 200 pieces of equipment simultaneously. The shop will be located next to the Betts incinerator, and a waste-heat plant is being constructed to provide hot water, steam, and central heating for the new building. [Gen. 2 pp. 1 ill.]

152. COMPANY PRESENTS LARGE NEW SIDE LOADING PACKER. *Refuse Removal Journal*, 6:4:34, April 1963.

Some of the features of this new refuse collection unit are: a 32-cubic-yard body is installed on a straight truck chassis with tandem axle; the unit can be used either as a container loader or a hand loading unit; the curved back door allows compressed rubbish to be pushed upward, giving payload density at top as well as bottom; the rear door is unlatched at the side of the truck; the compacted refuse is ejected with one sweep of packer blade while body remains on truck frame; and heavy duty containers are mounted on ball and roller bearing casters for easy mobility. [News. 1 p. 1 ill.]

153. CONTAINER PAINT IS ACID-RESISTANT. *Refuse Removal Journal*, 5:4:34, April 1962.

A paint which is resistant to the acids in refuse is being produced by a Detroit, Mich., firm. The company makes air-dry industrial enamels from the alkyd paints left over in the stocks of the major automobile manufacturers at the end of each year. Refuse contractors who own attachable containers should find maintenance easier with use of this finish on their refuse containers. [News. ½ p. 1 ill.]

154. IN DEFENSE OF THE DIESEL. *Public Cleansing*, 52:4:163, April 1962.

Compares the diesel and petrol engines and gives some guidelines to follow in deciding which engine to use in refuse collection vehicles. It is not always a question of merely petrol versus diesel in deciding which motor to use; other factors must be considered in each particular case—arrangements for maintenance facilities, area of operation, mileage to be traversed, the type of engine to be used, transmission arrangements, and cost of replacement engines. For the small local authority the decision becomes extremely difficult, but in large refuse collection areas the diesel generally proves to be the best. Gives the fuel consumption records for both diesel and petrol collection vehicles used in Rochdale and Sunderland, England. In Rochdale conversion of part of the collection fleet to diesel increased gas mileage from 4.7 to 7.3 miles per gallon. [Gen. 2⅔ pp.]

155. DURABLE TRUCK CHASSIS IS VITAL TO PROFITABLE REFUSE OPERATION. *Refuse Removal Journal*, 6:8:25, August 1963.

The truck chassis plays an important part in the refuse removal operation. The contractor should look for sound engineering, extra strength and durability in the truck chassis, but not at the expense of easy handling in city traffic. The truck chassis today is under a heavy burden, with the trend toward bigger compactor bodies, and receives punishment on the sanitary landfill site from the rough terrain and repeated jolts of the unloading process. Another consideration is the extraordinary demands made on the engine of the packer unit; because of frequent standing, engine mileage is frequently two to three times greather than chassis mileage. The need to choose the right equipment is a great one for the refuse contractor. [Gen. ½ p.]

156. AN ENGLISH COMMENT ON MODERN EQUIPMENT. *Refuse Removal Journal*, 6:1:26, January 1963.

A description of modern trends in refuse equipment. Includes brief discussions of the following equipment: rear-loading refuse trucks; multipurpose vehicles; continuous loading equipment; dustbin refuse collection; bulk transportation vehicles; compaction plate compression; transfer depots; equipment within the refuse vehicle motors; and street-cleaning vehicles. [Gen. 2 pp.]

157. EQUIPMENT MANAGER LIKES AUTOMATIC TRANSMISSIONS. *Refuse Removal Journal*, 5:8:27, August 1962.

Nearly one out of every four trucks in service with the city of Minneapolis, Minn., is equipped with an automatic transmission. The switch from stickshifts is a part of the city's long-range program to effect major equipment economies—in purchase price as well as maintenance, repair, and downtime frequency and expenditures. A saving of $2,000 to $3,000 can be made on every unit purchased, because the automatic with its built-in torque converter makes it possible to buy lighter trucks which do an equally effective job. Also, automatic transmissions are proving an antidote for burned out clutches, frequent brake relinings, chronic differential troubles, and annual transmission replacements. [Det. 1 p.]

158. FIVE FEWER COLLECTION ROUTES. *The American City*, 78:12:28, December 1963.

The city of Fort Worth, Tex., has put into operation 46 new packer refuse collection trucks. The new fleet has boosted efficiency enough to reduce the number of collection routes by five. The consolidation of routes, the reduction in labor requirements, and the reduced need for maintenance will result in an annual savings of $65,000. The total cost of the new units was $282,502. [News. ⅓ p. 1 ill.]

159. FLORIDA COMPANY SWEARS BY ITS TWO-WAY RADIO. *Refuse Removal Journal*, 5:8:20, August 1962.

Two-way radio is now being used by this Fort Lauderdale, Fla., refuse contractor, and results have been very favorable. Transistorized mobile units have been installed in pickup trucks and supervisors' cars, and a 60-watt, locally controlled base station is utilized, the antenna being located on top of the company building. The refuse firm uses the radio system to make pickups missed during drivers' regular routes, to carry out special requests for pickups, to dispatch service vehicles to trucks in distress, to dispatch supervisors from route to route to iron out any problems which may occur, to check out accounts, and to dispatch trucks which have completed their routes to areas where pickups are going slowly. [Gen. 1½ pp. 3 ill.]

160. "Golden Yellow" Color Found Useful on Trucks. *Refuse Removal Journal*, 5:12:20, December 1962.

A change in the color of sanitation vehicles from gray to "golden yellow" has produced many advantages for the New York City Sanitation Department. The vehicles are now easier to keep clean, present an attractive appearance, can be more easily seen, and attract attention to the antilitter slogans written on them. The sanitation department has a special Division of Painting, which operates two paint shops, each with a capacity for painting six vehicles a day. The paint used is a yellow enamel with an alkyd resin base. The city buys the ingredients and mixes the paint itself according to a special formula, thereby enabling the city to realize a 75 percent savings on the paint. [Gen. 1½ pp. 2 ill.]

161. Hauler Makes Sure That the Truck Fits the Job. *Refuse Removal Journal*, 5:6:22, June 1962.

One of the primary concerns for this New Jersey contractor is keeping his refuse fleet in top condition. The following are discussed as ultraimportant for good fleet operation: vehicle purchase, with confidence in the supplier; preventive maintenance; correct driving procedures; quality repair work, using genuine factory parts; and a vehicle replacement program. [Gen. 2⅓ pp. 1 ill.]

162. How Big Is Your Dustcart. *Public Cleansing*, 52:2:60, February 1962.

Motor buses in Great Britain are now permitted to be increased in length from the previous maximum of 30 feet to 36 feet and in width from 8 feet to 8 feet, 2½ inches. Discusses whether this extension of size would be applicable with advantage to sanitation vehicles. Solution to this problem will be influenced by the necessity to balance maximum capacity on the one band against minimum acceptable maneuverability on the other. Capacity is determined by length, width, and height of body and degree of compression. Maneuverability is determined by amount of front and rear overhand, basic wheel base, and lock or steering geometry. [Gen. 1½ pp. 1 ill.]

163. How to Handle Tire Maintenance. *Refuse Removal Journal*, 5:2:21, February 1962.

Tires represent one of the areas in the trucking business in which careful investment, wise selection, and good maintenance result in substantial savings. This article offers helpful hints in keeping tire expenditures at a minimum. (1) Pick the right tire for the job it is expected to do. Considerations include type of equipment, types of road surfaces, body clearance, rim size and spacing, length of haul, average and maximum speeds, and kind and weight of load. When possible, it is suggested, apply new tires during the fall and winter instead of spring and summer. (2) Maintain proper inflation in the tires. Both over- and under-inflation are hard on tires, but the latter is by far the most harmful. (3) Air should not be bled from tires while they are hot. (4) On over-the-road operations inflation should be checked with air gauges once a week and inbetween checks should be made at rest stops by hitting the tires with a hammer. On local operations air gauge checks should be made once every two weeks and hammer checks daily. (5) Gauges should be checked twice weekly for accuracy. (6) Convenient air line outlets should be available so that not too long a rubber hose is needed to reach tires. (7) Air lines should be drained periodically. (8) Valve caps should be used to keep out dirt. (9) A comparative air loss record is helpful in reducing road delays. (10) Wheel alignment should be periodically tested. (11) Balancing front wheels pays off in lower maintenance cost. (12) On dual wheel assemblies the tires should be matched as closely as possible. [Det. 2½ pp.]

164. Magirus Machines Are Efficient and Simple. *Public Cleansing*, 52:2:84, February 1962.

Describes in detail a 14-cubic-yard, dustless refuse collector manufactured in Ulm, Germany. The vehicle was developed on the basis of experience gathered in many years of practice with an eye for efficiency and simplicity. There are no moving parts rotating in the refuse. A novel double-shovel loading system pushes the refuse to the interior of the body and compacts the load, eliminating voids. The rear hopper shovel has a capacity of 1.4 cubic yards at a loading height of only 39.3 inches. Loading and packing shovels are operated by hydraulic cylinders, and dumping is done by hydraulic hoist cylinder controlled by two hydraulic switches. [Det. 2¾ pp. 1 ill.]

165. Manufacturer Has Two New Container Systems. *Refuse Removal Journal*, 5:4:30, April 1962.

Two new front end refuse container systems that handle 6- and 8-cubic-yard containers have been added to the line of refuse container systems made by a Norway, Mich., manufacturer. Six or eight cubic yards of refuse can be picked up and loaded into the truck in less than 45 seconds. The systems include an automatic truck hopper cover, which is sequenced by packer platen action. A high pressure washer cleans and disinfects each container as soon as its load has dropped into the truck and also cleans the truck and body at the dump site. [News. 1 p. 2 ill.]

166. Manufacturer Introduces New Model of Compactor. *Refuse Removal Journal*, 5:10:26, October 1962

A new model push-out refuse collection truck body is being introduced by a refuse truck manufacture.

The manufacturer incorporates the principle of packing and discharging loads with the same horizontally mounted hydraulic cylinder. The new units do not elevate to discharge loads, making them capable of handling refuse collection operations with restrictive unloading conditions. Total packing force behind the unit's compressor plate is 1,875 pounds per square foot. [News. ½ p. 1 ill.]

167. Measure Job, Then Purchase Equipment. *Refuse Removal Journal*, 6:7:20, July 1963.

Discusses considerations which should be made in purchasing refuse collection equipment. Two necessary items which should take precedence are the selection of the chassis and selection of the refuse body. Load and gross vehicle weight, speed and gradability of the refuse truck, and turning radius are considerations in choosing the truck chassis; capacity, type of refuse, method of collection, mechanical features, appearance, sanitation, and usability for other types of work are factors which should be taken into consideration in the selection of the refuse body. [Gen. 1⅔ pp.]

168. Motorized Setout Crews. *The American City*, 78:1:27, January 1963.

Cleveland Heights, Ohio, has boosted the number of refuse pickups per day and reduced the manpower requirements by establishing a "scooterized" setout crew. The city acquired ten small scooter trucks to perform the task of transporting refuse cans from the back doors of residences to the street where they are emptied. The 18-horsepower units have enabled 52 men to do the same work which formerly required 76 men. The city also uses the scooter trucks to transport street sweepings to the incinerator. [News. ½ p. 2 ill.]

169. New Equipment Aids Chicago Contractors. *Refuse Removal Journal*, 6:5:16, May 1963.

Two Chicago, Ill., refuse-hauling contractors have found a way to avoid the necessity of sending out expensive, heavy equipment and extra manpower to perform jobs that could be done with lighter equipment and fewer men. They recently purchased a small trailer to pick up and deliver empty containers that need repairs, to pick up refuse on widely scattered accounts, and to collect bulky items. The new trailer, which can be towed by a small truck or car, raises and lowers hydraulically, eliminating the labor of lifting, and features a load levelizer to compensate for nonuniform load distribution. [Gen. 1 p. 1 ill.]

170. New Model Expands Packer Line. *Refuse Removal Journal*, 6:2:24, February 1963.

Describes a new 20-cubic-yard refuse packer recently introduced by a metal products company. Some of the features of the new vehicle include: (1) a hydraulically operated packer blade with a maximum compaction force of 91,000 pounds; (2) loading doors with a new low height on both sides of the truck; (3) a 4-cubic-yard loading area; (4) an extra strong floor and sides; and (5) a watertight compartment extending 30 inches above the floor to eliminate leakage. [News. ½ p. 1 ill.]

171. New York City Adds Refuse Collection Units. *Public Works*, 94:2:164, February 1963.

The first 30 units of the biggest municipal refuse collection truck order in history were recently delivered to New York City. The order covers 225 packers of 16-cubic-yard capacity and 25 packers of 20-cubic-yard capacity, increasing the city's refuse fleet up to the total of 1,585 packers. [News. ¼ p. 1 ill.]

172. No Summer Holiday for This Atkinson Gritter. *Public Cleansing*, 53:9:455, September 1963.

Describes how the city of Southend-on-Sea, England, converts its Atkinson gritter into a bulk refuse truck during the summer months. [News. 1½ pp. 1 ill.]

173. The Norba System. *Public Cleansing*, 52:1:19, January 1962.

Describes the Norba System of refuse collection, a method by which dustbins are automatically emptied in a closed condition into the container of the collecting van through a specially designed delivery shutter in such a way that the contents of the dustbin are never exposed. The two main components of the system are the Norba-refuse collecting vans of which there are several types, and the dustbins which have tight-fitting, hinged lids. At the rear of the truck body there is an automatically operated hydraulic lift which raises the dustbins from the ground and tips them into the container through a dustless emptying shutter. The refuse drops onto a rotating cast-steel screw and is propelled into the container under heavy pressure. After the dustbin has been emptied, the lift automatically lowers it and simultaneously the the dustbin lid closes. Emptying of the container at the disposal site is also accomplished automatically. [Gen. 1½ pp.]

174. Northwestern Haulers Enthuse Over Packers. *Refuse Removal Journal*, 5:7:8, July 1962.

Even though there has been swift proliferation of compaction refuse bodies throughout the country during the past several years, there are still many thousands of open trucks used for refuse collection. This article relates the enthusiasm of several refuse haulers in the Pacific Northwest area who have recently purchased compaction refuse trucks. Some of the gains realized from this type of refuse truck were a great savings of time and effort, and a reduction in fuel expenditures. [Gen. 2 pp. 3 ill.]

175. **Old Dust-Carts Never Die.** *Public Cleansing*, 53 : 4 : 164, April 1963.

The city of Westminster, England, has replaced 12 of its 22 battery-operated refuse collection vehicles. However, the old vehicles will not be discarded entirely, for their original motors, which are in sound condition despite their length of service, are to be incorporated into new bodies and chassis. This conversion has been caused by the lack of large articulated electric vehicles on the market of the type needed by the city. Each of the new vehicles is powered by a 44-all-traction battery which provides enough power for the vehicles to operate a normal 8-hour shift with ease. [News. ½ p.]

176. **Packer Manufacturer Offers Aid to Container Selling.** *Refuse Removal Journal*, 5 :4 :28, April 1962.

A new trailer, designed to help salesmen in their efforts to promote the use of attachable containers, has been introduced. The trailer will hold two containers of any size and can be easily hauled behind a passenger car or small pickup truck to facilitate demonstrations to prospective customers or to help in the relocation of customers who already have containers. [News. ½ p. 1 ill.]

177. **Prevent Truck Failures By Proper Maintenance.** *Refuse Removal Journal*, 6 :8 :27, August 1963.

A large percentage of breakdowns of mechanical equipment (or refuse collection trucks) can be traced to the failure of the operator to choose the proper petroleum fuels and lubricants to suit the rigors of heavy-duty trucking. In the stop-and-go driving encountered by refuse collection trucks, the engine is always below full operating temperature. A heavy-duty lubricating oil is essential to protect the engine against harmful results of low operating temperature. The article lists four symptoms of the use of too light a grade of oil and five symptoms of the use of too heavy a grade. The pour point of the oil is important, for it shows how readily the oil will flow to the pump outlet at low temperatures. [Gen. ¾ p.]

178. **A Purchasing Agent on Topic of Specifications.** *Refuse Removal Journal*, 5 :8 :30, August 1962.

Discusses guidelines for preparing equipment specifications. Basically, the steps involved in the development of performance-type equipment specifications are: (1) determining the need; (2) developing the specification; (3) testing the specification; (4) developing the bid form and mailing list; (5) analyzing the bids and making the award; and (6) performing the inspection function. [Gen. 1 p.]

179. **The Ramillies.** *Public Cleansing*, 52 :11 : 501, November 1962.

Describes a new refuse collector which will hold 50 or more yards of refuse and has rapid continuous loading. By careful design and the use of noncorrosive light alloy for the main structure, it has been possible to keep the weight of this vehicle below the maximum legal weight even when filled to capacity. The hydraulic compressing system has been designed to be as simple and yet as robust as possible. The compressing plate has constant angle radial action and is controlled by arms and guides. Only one moving part, the compressing plate, is in contact with the refuse. Although able to generate a very high degree of compression, the hydraulic mechanism does not use high oil pressures, the maximum pressure being only 1,500 pounds per square inch. [Gen. 1 p.]

180. **"Rock-a-Bye Baby" for Refuse Collection.** *The American City*, 77 :4 :14, April 1962.

The Bureau of Public Cleansing in Tokyo, Japan, uses music boxes on refuse collection vehicles to alert residents to place their refuse cans on the curb. The bureau is also gradually replacing old wooden and concrete trash bins with small, lidded plastic containers. [News. ⅓ p.]

181. **Safety Is Only One of the Benefits.** *The American City*, 78 :2 :97, February 1963.

Most public-works officials believe that painting municipal equipment bright or distinctive colors reduces accidents. Other benefits from a well-chosen color scheme include ready indentification of equipment, public relations, increased morale of operators, and uniformity. Briefly relates color schemes used in several Canadian cities—Calgary, Montreal, Winnipeg, Edmonton, and Ottawa. [Gen. 1 p. 2 ill.]

182. **Smaller Diesels Show Promise for Collectors.** *Refuse Removal Journal*, 5 :3 :26, March 1962.

The recent development of lighter, more compact diesel engines has enabled light- and medium-duty truck operators engaged in city, multistop hauling to take advantage of diesel economy, dependability, and long life. The fuel injection system of the diesel controls fuel input in relation to actual work done far more closely than the carburetion system of other types of engines. This means that the diesel engine consumes less fuel while the truck is running empty to full load and while the engine idles intermittently at pickup points. The experience of a refuse company in the Chicago, Ill., area provides an example of such fuel savings: the company reports that one of its trucks which has recently been repowered by a diesel engine now runs three days on the same amount of fuel previously required for a single day's operation. [Gen. 1 p. 1 ill.]

183. **Traction Batteries.** *Public Cleansing*, 53 : 1 :41, January 1963.

The choice of power for traction purposes depends primarily upon operating costs for the duty required. Where long distances and high speeds are involved the advantage lies with the internal combustion engine; but where frequent stopping and starting is required, as in refuse collection, the battery vehicle, in spite of higher initial cost and interest charges, can show much lower annual operating costs. This article on traction batteries covers: the development of the storage battery; applications of battery traction; battery design problems; discharge schedule; design features to improve durability; effect of discharge current on capacity; charge schedule; temperature; mechanical stresses; maintenance; and future trends. Discussion follows the article. [Det. 11½ pp.]

184. Truck Breakdowns Blamed on Improper Driving Practices. *Refuse Removal Journal*, 6:12:18, December 1963.

According to records kept by the American Trucking Association and other organizations actively concerned with the trucking industry, the causes of most on-the-road breakdowns can be traced, directly or indirectly, to improper driving practices, and the failure of the driver and maintenance mechanic to properly evaluate damage to small parts. This article gives a set of "road rules" to improve driving practices, outlines some of the more common mechanical failures that affect small parts, and makes suggestions concerning their causes and remedies. The failures discussed include bearing failures, wrist pin failures, piston or cylinder scoring, piston difficulties, burned valves, stuck tappets, and broken valve springs. [Det. 3 pp. 3 ill.]

Bellar, Arthur J.

185. Greater Capacity, Better Collection. *The American City*, 77:4:87, April 1962.

The city of Columbus, Ohio, has recently replaced 34, 14-year-old nine-cubic-yard refuse collection units with an equal number of new 16-cubic-yard packers and plans similar additional changes in the future. Conversion of the collection fleet has enabled the city to provide weekly combined garbage and trash collections and has substantially improved the collection-hauling time ratio. [News. ½ p. 1 ill.]

Brooks, John W.

186. How to Reduce Tire Wear. *The American City*, 78:2:154, February 1963.

Describes briefly the tire maintenance program for refuse collection trucks in San Antonio, Tex., listing seven fundamental maintenance practices. City officials have found, also, that automatic transmissions in sanitation trucks improve operating conditions for the driver and reduce downtime due to failures of clutches, transmissions and rear ends. [Gen. ½ p.]

Clark, James R.

187. Attention to Clutch Can Reduce Your Fleet Costs. *Refuse Removal Journal*, 6:1:16, January 1963.

All too often experienced automotive men tend to regard the clutch too lightly. It can be a major source of trouble, responsible for many seemingly unrelated automotive ailments. The article outlines comprehensive truck clutch program, breaking it down into the following categories: (1) initial selection of the proper clutch, matched to components; (2) correct driving procedures at all times; (3) a clutch maintenance program with depth; and (4) a planned, quality clutch replacement program. [Gen. 2 pp. 1 ill.]

Cole, Clayton K.

188. Your Money's Worth in Detachable Containers. *Refuse Removal Journal*, 5:12:12, December 1962.

Discusses four factors beyond list price and delivery which should be considered and investigated in purchasing detachable containers: (1) Design. Check for sufficient reinforcements at critical spots such as corners, under lifting attachments, etc. Compare hinges, latches, and counterbalancing springs on closed containers. Consider kind of material and thickness; (2) Workmanship. Welding is the most important consideration here. Continuous welding on inside and outside of major seams, and on appendages used for lifting or dumping is required for top quality. Good quality finishing should include at least two coats of enamel or one coat of primer under one coat of enamel; (3) Price per cubic yard. In comparing two containers of the same type, the one which sells for the lesser cost per cubic yard would be best. (4) Price per pound. Assuming equal design and workmanship, life expectancy will be proportional to the amount of material used in construction. [Gen. 1½ pp. 1 ill.]

Fisher, H. R.

189. Faster Flat-Tire Repairs. *The American City*, 77:9:19, September 1962.

Describes the new tire-replacement trucks used by the city of Los Angeles, Calif., to service flat tires encountered by its refuse collection trucks. The vehicles are cab-over-engine models equipped with special racks for ten tire-and-rim assemblies, gasoline-powered compressors to provide air for lug-nut-removing wrenches and to blow up slow-leaking tires, tool boxes, compartments for transporting traffic equipment, and two-way radios. The city employs one of these vehicles in each of its five districts, and there are on the average, 25 flat tires each day to repair. [News. ⅔ p. 1 ill.]

Lewis, W. A.

190. The Behaviour of Refuse Under Compression As Related to Refuse Collection Vehicles. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

As refuse becomes lighter and the bulk increases, compression by the collecting vehicle assumes greater importance if loads are to be obtained which approximate the weight-carrying capacity of the vehicles. The article describes a series of compression tests carried out to determine how much compression is required now and in the future, and how best it may be obtained. Several types of refuse of varying densities (from tenements, centrally-heated apartments, and from businesses) were used in the tests; unsorted refuse was first tested, followed by similar tests conducted on the main constituents of household refuse after their separation. A cylindrical container of 22-inch diameter and 32-inch depth was used for the compression chamber. A metal plate was placed on top and known pressures were applied in stages, volume reduction being measured at each stage. The article discusses pressures exerted by five compression vehicles, which are representative of the various types available in Great Britian, and the relationships between the compression ratios, the pressure exerted by the compression plates (in pounds per square inch), and total thrust by the compression rams of the five vehicles. A test was conducted to find out more about the variation in density between the front and rear of the compressed refuse load. Also briefly describes the continental refuse compression vehicles, which are of the rotating cylinder, worm, or screw type. [Det. 12 pp. 1 ill. 3 tab. 2 diag. 3 gr. 1 ref.]

Lucia, Frank J.

191. Golden Yellow for Safety. *The American City*, 78:3:27, March 1963.

Briefly describes the activities of the Division of Painting, New York City Sanitation Department, in painting 2,200 municipal refuse-collection trucks, mechanical sweepers, and bulk-collection trucks. Each vehicle is given a coating of a striking new gold color every year. Refuse trucks take as much as three gallons of paint a piece, and the city has found it considerably cheaper to buy ingredients and mix the paint itself. The paint being used is a yellow enamel with an alkyd resin base. [News. 1 p. 2 ill.]

O'Leary, Timothy J.

192. Motor Vehicle Fleet Maintenance. *1962 American Public Works Association Yearbook*, p. 241.

A detailed description of the motor vehicle maintenance branch of the Boston Department of Public Works. Includes a breakdown of the department's fleet of vehicles and vehicle maintenance personnel. Also gives details of a new experiment in which the city has changed its method of contract refuse collection in one of its districts. In the experiment, the public works department furnishes collection trucks and the contractor supplies labor, supervision, and maintenance. (See item No. 193.) [Det. 2½ pp.]

193. Motor Vehicle Fleet Maintenance in Boston. *Refuse Removal Journal*, 6:2:18, February 1963.

Reprint. (See item No. 192.) [Det. 1½ pp.]

Osmer, John E.

194. Equipment Used in Refuse Collection. *Michigan Municipal Review*, 35:4:101, April 1962.

Results of a survey of refuse collection in Michigan municipalities. Gives statistics on the number of cities using the various methods of collection—municipal, contract, private hauler, and combinations of the three, and on the number of cities using the various kinds of refuse collection trucks—compactors, dump trucks, and a combination of the two. Also gives a few statistics on the size of the collection trucks used, the number of hours they are in operation, and on other uses of the collection equipment. [Det. 1 p. 2 tab.]

Pertl, J. H.

195. Obsolete Sanitation Trucks Are Back in the Chips. *Public Works*, 94:4:106, April 1963.

Portable brush chippers in tow behind locally modified sanitation trucks have proved ideal as brush disposal units for the Cicero, Ill., forestry department. The enclosed trucks can haul bigger loads of chips at higher speeds than dump trucks of equal capacity. Describes how the old packer trucks were converted to brush-carrying vehicles. [Gen. 1 p. 2 ill.]

Taylor, Frank

196. An Open and Shut Case for Economy. *The American City*, 77:2:22, February 1962.

By converting from open-truck refuse collection to an enclosed compactor unit, Glasgow, Ky., saves more than $1,400 annually (after subtracting the increased depreciation costs), and litter from refuse collection operations has been eliminated. [News ⅓ p.]

F. COLLECTION—General

Anonymous

197. Advertising Is A Help to Northwest Contractor. *Refuse Removal Journal*, 6:3:12, March 1963.

A Vancouver, Wash., refuse collecting firm, faced with an expanding population and service area, found refuse cans in new subdivisions crammed with backbreaking loads of building materials. The answer to this and other public relations problems was found in the creation of "Sanitary Sam," an imaginative cartoon character, who in a light, good-natured style explained the company's problems to its customers in a series of newspaper ads. [Gen. 2¼ pp. 4 ill.]

198. Attention to Detail Has Paid Off for Young Firm. *Refuse Removal Journal*, 5:2:10, February 1962.

The remarkable growth of this Rochester, N.Y., refuse hauling business is attributed to the owner's attention to detail and installation of the container system of refuse collection. The firm, owned and managed by two brothers, has developed from a one-truck business serving a residential route of 225 customers to a modern, thoroughly containerized industrial and residential removal business. The owners take pride in keeping their refuse fleet spotless, in keeping close relationships with their employees and customers, and in introducing innovations into their business. They are presently experimenting with the use of motor scooters for transporting heavy refuse cans to the packers and are working on two electronic devices which will hopefully increase safety in refuse collecting operations. [Gen. 2 pp. 3 ill.]

199. Blackburn's Method of Dustless Loading. *Public Cleansing*, 52:12:553, December 1962.

Briefly discusses refuse collection in Blackburn, England. The city dwellings are mainly of the terrace-type with bins in the backyards which open onto the streets in widths varying from 8 to 12 ft. These conditions severely limit the size of vehicle usable. Blackburn has solved this problem with the use of compression vehicles, enabling the small refuse trucks to hold more refuse than without the compression mechanisms. The city is now experimenting with a dustless collection vehicle. This vehicle lifts and empties refuse bins of any shape and size with the absolute minimum of dust emission and has ample and easy facilities to load articles other than the contents of the bin. [Gen. 2½ pp.]

200. Bonus Schemes. *Public Cleansing*, 52:8:360, August 1962.

Extracts from a paper entitled, "Incentive Bonus Schemes—Refuse Collection," by Mr. A. E. Higginson. Emphasizes that predetermined targets (toward the improvement of a refuse collection service) must be realistic and that they can be based upon number of bins or premises cleared daily, weight of salvage collected, weight of refuse collected, or on the task system. Describes the bonus scheme being used in Chesterfield, England, in which all bins collected after the basic 11.5 bins per man per house are rewarded by a payment of 2d. to the collector. Keener interest, efficiency, appreciation and satisfaction from the public, and a lower overall unit cost of collection have resulted from the scheme. Also includes discussion of the paper. [Ext. 2 pp. 1 tab.]

201. Californians Form a Statewide Association. *Refuse Removal Journal*, 5:11:8, November 1962.

A significant and long-sought goal was recently reached by California refuse industry leaders with the formation of a single statewide association known as the California Waste Removal Council. The new association, believed to be the first truly statewide refuse collectors' association, has as its primary purpose the solution of the industry's problems at the State level and coordinating of California's participation on the national level. The article quotes the association's "Declaration of Interest" and lists the elected officers of the Council. [Gen. 1¼ pp.]

202. Canadian City Picks Contract Collection. *Refuse Removal Journal*, 6:2:6, February 1963.

Briefly describes refuse collection in Burlington, Ontario, Canada, which is accomplished by the contract system. The refuse company serving the area uses one-man units for its collection service, thereby giving it an advantageous competitive bidding position. The firm is able to use the one-man units for two reasons: the compaction trucks used have walk-in cabs and standup controls; and a municipal bylaw requires all refuse receptacles to be placed at the curb for collection. [Gen. 1½ pp. 3 ill.]

203. City Profits From Ten-Year Collection Contract. *Refuse Removal Journal*, 6:6:30, June 1963.

Describes the refuse collection system in Palo Alto, Calif. In 1960 the city changed from municipal to contract collection by signing a 10-year contract with a refuse hauling company. The agreement provides for all city refuse removal equipment turned over to the firm; continuing city supervision of the refuse service through a full-time sanitation supervisor in the city engineer's office; 20 percent of assessments collected kept by the city for providing refuse disposal and a billing service; backyard collections along routes specified by the city engineer's office; and a minimum service of once-a-week combined collection from two 32-gallon cans for householders and one 32-gallon can from apartment dwellers. The private operator was also required to improve on the previous municipal collection service. [Gen. 1 p.]

204. City Seeks New Deal for its Contractors. *Refuse Removal Journal*, 6:6:25, June 1963.

The mayor of Orange, Calif., wants to revamp charges for refuse collection. At the present, each resident pays $1 per month for one collection of one unit a week, while merchants get 6 weekly collections at the same per-unit rate. But the private contractor who handles the collections is paid only 84 cents for each household or commercial firm serviced, regardless of its frequency or the number of units involved. This usually puts the contractor on the losing end of the arrangement. One solution proposed by two city councilmen would be to raise the city's charge to householder and merchant alike to $1.25 per month, and require that the contractor make only one collection per week for everyone. Those wishing more frequent service could then deal directly with the contractor. [News. ¼ p.]

205. Cleaning and Collection. *Sweep*, 4:3:6, Autumn 1962.

Summarizes the activities of the Bureau of Cleaning and Collection, which constitutes the heart and muscle of the New York City Department of Sanitation. Includes the organization of the Bureau, refuse collection, street cleaning, flushing, lot cleaning, litter receptacles, parade cleanup, emergency operations, and the auxiliary field force. [Gen. 2 pp.]

206. CLEANSING IN AN URBAN DISTRICT. *Public Cleansing*, 52:4:159, April 1962.

Extracts from an annual report for 1960 by Brierley Hill Urban District Council's Public Health Inspector and Cleansing Superintendent. Reports that: a weekly refuse collection service was maintained except when absences were numerous; a bin bonus scheme gave a 20 to 25 percent increase in wages and work output; purchase of rubber lids for refuse containers is being contemplated to reduce noise; refuse charges have been doubled although wastepaper is still collected without charge; and mechanical conveyors and a "Flying Squad" vehicle were used for street cleaning. [Ext. ⅔ p.]

207. COMMUNITY SHOWS SAVINGS BY USING CONTRACT METHOD. *Refuse Removal Journal*, 5:5:10, May 1962.

Oak Park, Mich., has saved almost $53,000 in 1 year by changing from municipal to private contract refuse collection. The contractor made a successful bid in April 1960 and signed a 3-year contract with the city. The hauler purchased the city's collection fleet, but he has since replaced it with units of greater capacity. Most of the refuse collected in Oak Park contains no garbage, because a 1952 city ordinance required all new homes to be equipped with garbage disposal units. The private contractor is currently collecting from 9,200 residential units at a cost to the city of $0.14 per unit per week, from 443 business units at $0.20 and from 647 multiple-dwelling units at $0.15. Oak Park is a member of the Southeastern Oakland County Rubbish and Garbage Authority, which operates an incineration plant and an 80-acre landfill site. City officials have found that refuse collection by private contracts not only is cheaper, but also allows the city's public works department to devote full time to services other than refuse collection. [Det. 2 pp. 2 ill. 1 tab.]

208. COMPANY SPECIALIZES IN SHOPPING CENTER UPKEEP. *Refuse Removal Journal*, 5:7:6, July 1962.

Describes a company in Enola, Pa., which specializes in the entire exterior maintenance of shopping centers. Although refuse collection is its largest job, it also provides other services such as landscaping, minor repairs, snow removal, lot sweeping, replacement of burned-out bulbs, traffic planning, and the stripping of parking lots. Specialization has been the key to this firm's success. It has refrained from seeking residential business partly because of the plentiful supply of small refuse operators in the area who are willing and able to accept lower prices for collection jobs. Conversely, maintenance of shopping centers cannot be handled by the small operators, and therefore there is little competition in this field. [Gen. 1 p.]

209. CONTAINERS AND PLANNING AID DELAWARE CONTRACTOR. *Refuse Removal Journal*, 5:8:6, August 1962.

Installation of the containerized system and careful collection route planning have aided a Wilmington, Del., refuse contractor in operating an efficient and sanitary business. The appearance of a modern garden apartment building which the contractor serves has been greatly improved by the replacement of 254 unsightly garbage cans which had been scattered about the apartment grounds, with 50 relatively attractive refuse containers. The contractor also services an additional thirty 1- and 2-cubic-yard containers at various other accounts. Through careful planning, the contractor is able to make pickups at the precise time most containers have their maximum loads and is able to make the last pickup only minutes away from the disposal area. [Gen. 2 pp. 2 ill.]

210. CONTRACTOR CUTS CITY COLLECTION COSTS ONE-THIRD. *Refuse Removal Journal*, 6:8:14, August 1963.

Describes the growth of a refuse contractor in the city of Kitchener, Ontario, Canada. The city recently changed its municipally operated refuse collection service to collection by private contract and has subsequently reduced its annual costs by over $67,000. The private contractor was able to improve the efficiency of refuse collection and expand services by adjusting routes, maintaining close supervision of working crews, replacing older machines with more advanced equipment, and introducing containerized collection at commercial accounts. [Gen. 2¼ pp. 4 ill.]

211. CO-OP VENTURE SUCCESS FOR FIVE CALIFORNIANS. *Refuse Removal Journal*, 6:12:6, December 1963.

Describes a refuse removal, processing, and salvaging business in Los Angeles County, Calif., which reports a gross annual income of nearly $1 million. Before 1950 the owners of this refuse firm operated two small, separate refuse businesses. Realizing the potential of the refuse industry in the rapidly growing Southern California area, these two businesses merged into one in 1950. The new firm rapidly grew from three wornout obsolete refuse trucks and a complete lack of organization to a 13-truck fleet, and a roomy administration and maintenance headquarters on a 1-acre plot in the city of Bell. The firm now services nine routes with 2,000 commercial and industrial pickups, all in Los Angeles County. [Gen. 2 pp. 3 ill.]

212. DIFFERENCE IN REFUSE. *The American City*, 78:4:17, April 1963.

Gives a brief outline of the study on methods of sampling and analyzing refuse conducted by James E. Etzel and John M. Bell, Department of Sanitary Engineering, Purdue University, and some of the results obtained. (See items No. 102 and No. 112.) It was found that significant differences exist in quantity and quality of refuse between the various socioeconomic levels of the community and between the various seasons of the year. Also, the amount of refuse collected per capita per day was found to drop as the number of people in the household rises. [News. ½ p. 1 tab.]

213. "Dustless" Collection Progresses in Britain. *Refuse Removal Journal*, 5:8:12, August 1962.

Although the dustless refuse collection system was first introduced in Great Britain 30 years ago, it has only recently been adopted in many areas. The main reason for the slow rate of progress seems to be the high costs involved in installing the system. Birmingham, Bristol, Edinburgh, Glasgow, St. Marylebone, Sheffield, Tottenham, and a few other authorities have introduced dustless collection with favorable results. The article describes the system in operation in St. Marylebone. [Gen. 2 pp. 1 diag.]

214. An Entirely New Fleet of Vehicles. *Public Cleansing*, 52:1:13, January 1962.

With an increase in population, a necessity to transport refuse several miles to a neighboring authority, and a progressive shortage of labor, the community of Ruislip-Northwood, England, has had to reorganize its refuse collection system. A bonus scheme based upon attendance at work, in addition to the existing arrangement for sharing the bonus unearned by absentee workers, has been initiated. Also, entirely new collection fleet has been purchased, and a closely prepared schedule of times for leaving the routes for the tipping site and the return will ensure maximum work output and completion of schedules. [Gen. 1¼ pp.]

215. Ex-Food Caterer Builds 28 Truck Toledo Route. *Refuse Removal Journal*, 6:7:8, July 1963.

Describes the operations of a refuse removal business in Toledo, Ohio. The firm, which is owned and managed by a woman, serves mostly commercial accounts. Of special interest is the stationary compaction system which the firm operates. [Gen. 2 pp. 5 ill.]

216. Fast-Growing Ohio Firm Avoids Overextension. *Refuse Removal Journal*, 5:3:10, March 1962.

This article tells of the rapid expansion of a refuse collection firm in the Cincinnati, Ohio area. The expansion was the result of a combination of two businesses—an Ohio firm which was supplying a sweeping service for the area, and a northern Kentucky refuse hauler. It has been a cautious expansion, however, for the firm has not tried to obtain more business than it was sure it could handle. The firm has maintained a constant three to one ratio of commercial to residential work so that if a residential contract is not renewed, the commercial business can absorb the idled equipment and employees. In addition to refuse collection, the Ohio firm also operates a spray service. Containers, at establishments wishing this service, are regularly cleaned out with chemicals. [Gen. 1⅔ pp. 2 ill.]

217. Florida Collectors Form New State Association. *Refuse Removal Journal*, 5:10:8, October 1962.

A new association of private refuse contractors has been formed in Florida within the framework of the Florida Trucking Association. The members feel that the benefits of organizing in this manner are twofold: the membership will now have access to all of the financial backing, legal talent, political influence, and public relations facilities of the F.T.A.; and the membership will receive benefits from the exchange of ideas and discussion of problems which are common to all members of the refuse industry. [News. 1 p.]

218. Four-State Meeting Discusses Municipal Engineering Problems. *The American City*, 77:10:132, October 1962.

Briefly describes some of the municipal engineering problems discussed at the initial Mississippi Valley Public Works Conference held in Cedar Rapids, Iowa. Of special interest is a new thought in refuse-collection practice introduced by the Sioux City, Iowa, Service Director. Under present arrangements, private contractors make refuse collections under contracts with the city and use new, municipally owned packer trucks for the job. The States of Illinois, Iowa, Missouri, and Wisconsin were represented at the Conference. [Gen. 1 p. 2 ill.]

219. Garchey System Gets Streamlining. *Public Cleansing*, 53:1:9, January 1963.

Briefly explains the Garchey System of refuse collection. Householders discharge their refuse consisting of anything from food remnants to bottles and cans—down the sink into a special receiver unit connected underneath. By manually operating a waste-tube all unwanted waste is washed through to a main collection chamber. Each chamber is normally designed to hold 7 days' refuse. From here, the refuse can either be taken directly to the tip or to a central destruction works by collection tanker, or it can be directed to a central point of operation. A refuse collection tanker has recently been developed which vacuum sucks the refuse from the collection chamber and compresses it into a semisolid state, the whole operation being accomplished without any human hand coming into contact with the refuse. [Gen. 3½ pp. 2 ill. 1 diag.]

220. The German Chute System of Disposal. *Public Cleansing*, 53:6:286, June 1963.

A translation of extracts from the guiding principles for the design of dustbin stands, dustbin shelters, and rubbish chutes, issued by the Association of German Engineers. Discusses briefly the three classifications of refuse chute units. Gives requirements for the design of refuse chutes, covering: (1) soundproofing; (2) the refuse discard shaft—construction, material, shape, and cross sectional size; (3) the fittings through which refuse is thrown and the connection pieces between these and the shaft—construction materials, size, and slope; (4) a door for cleaning; and (5) the lower shaft end. [Gen. 3½ pp. 1 diag.]

221. Good Driving Under Good Conditions. *Public Cleansing*, 52:3:130, March 1962.

Describes the tasks of the truck driver during refuse collection and some improvements which can be made in the design of the vehicle's cab and in the training of the driver to lessen physical fatigue and increase safety: Local authorities so often pay many thousands of dollars for specially designed refuse-collection vehicles, and then leave the driving and care of the vehicle to a varied assortment of men of differing degrees of intelligence, without troubling to ensure that such men are trained to the needs of their task. [Gen. 2 pp. 1 ill.]

222. Haulaway, Inc., Serves a Large, Varied Clientele. *Refuse Removal Journal*, 5:11:6, November 1962.

Describes the beginning and growth of one of the largest private refuse hauling firms in the country, located in Omaha, Nebr. Emphasis upon good service, a policy of handling all kinds and quantities of refuse and an aggressive advertising program have helped this refuse firm to expand. The company serves a variety of customers—manufacturing plants, retail stores, buildings (public and private), hospitals, apartments, a race track, the Omaha airport, and an Army installation. [Gen. 2 pp. 4 ill.]

223. Hauler Resumed N.J. Service After Rejection. *Refuse Removal Journal*, 5:1:8, January 1962.

Describes the development and present-day operation of a New Jersey refuse collection firm serving the towns of Bloomfield, Verona, and Harrison. Owned and managed by three brothers, the firm is marked by a close relationship between customers and crew, and crew and management. It operates its own disposal site in the Jersey Meadows. From 1942 to 1946, Bloomfield gave up the company service and attempted to run its own municipal refuse collection service. After running into many problems the city soon returned to collection by private contract. [Gen. 1¾ pp. 1 ill.]

224. Heavy Industry Served by Big Container Idea. *Refuse Removal Journal*, 5:6:12, June 1962.

Describes the development and expansion of a commercial refuse hauling firm in Chicago, Ill. Established in 1914, this company now uses the large, detachable container system to serve industrial accounts within a 30-mile radius of the city. The firm's customers have found many advantages to the system, including a reduction in refuse collection costs and in internal handling of waste. Thirty-two containers of 15- and 20-cubic-yard capacities and three hoists are being employed at the present by the refuse hauling company. With this equipment an average of 400 yards of refuse are picked up daily. [Gen. 2½ pp. 5 ill.]

225. If Refuse Services Stop What Happens. *Refuse Removal Journal*, 6:7:25, July 1963.

Describes a hypothetical situation in which a town is greatly affected by a temporary cessation of the refuse collection services. Cessation occurred on a Saturday because the city council put off renewing its contract with the refuse collectors. Restaurant proprietors, who counted on special Saturday collections, were the first to feel the impact. Residents did not discover the trouble until they set out their refuse on Monday where it still remained by nightfall. They soon saw an influx of unwelcome pests whose favorite haunts are piles of stagnating garbage. The community's industrial establishments began to see their production falter on Tuesday as the growing accumulations of trash hampered operations. The council quickly reassembled and worked out a temporary solution to commence refuse collection once again. [News. ½ p.]

226. Incentive Bonus at Worthing. *Public Cleansing*, 53:10:520, October 1963.

Comments on a statement made in the article, "Bins or Sacks?—Economic Consideration." (See item No. 37.) The statement read: "Only recently such an innovation at Worthing designed for the benefit of the workers brought unrest and chaos through dissatisfaction." While it was true that when implementation was commenced there were teething troubles, and minor adjustments to a few of the work values were found to be necessary, nevertheless once these had been made, the difficulties were overcome. Complete introduction of the scheme took 7½ months. Apart from occasional individual exceptions, refuse collection and disposal employees are now earning each week, a bonus of at least 30 percent of their basic pay by putting greater effort into their work. [Gen. 1 p.]

227. Incentives. *Public Cleansing*, 52:1:36, January 1962.

A discussion of the use of a cash incentive system based upon the number of bins emptied each day to expedite refuse collection. Some of the problems involved with this type of incentive system were discussed, including: (1) annoyance to the public caused by some of the collectors starting before the normal working period; (2) refusal of the workers to collect bulky refuse not placed in dustbins; (3) the establishment of the number of bins which should be emptied in a normal work day; (4) the disappearance of the wage differential between the collectors and the supervisory staff; and (5) the "squeezing out" of aging employees by young bonus-hungry collectors. [Gen. 2⅓ pp.]

228. Industrial Hauler Likes Bulk Container Concept. *Refuse Removal Journal*, 5:2:6, February 1962.

An account of the development of a Detroit, Mich., industrial refuse hauler. The firm, established in 1936, has increased its fleet from one truck which did work for the Parks Department of the city to a force of 23 tractors and trailers, 3 front-end loaders, and 2 straight dump trucks in 1959. Recent installation of bulk detachable containers at the large industrial accounts has significantly increased business and reduced overhead. The firm now uses only four trucks equipped with hoists and employs only four drivers, one mechanic, and one grease and tire man, to collect 3,500 yards of refuse each week. [Gen. 2 pp. 3 ill.]

229. Larger Containers Allow More Stops With Smaller Crews. *Refuse Removal Journal*, 6:7:10, July 1963.

Describes a refuse hauling business in the Boston, Mass., area. The firm has found that the use of a container system for commercial pickups substantially decreases truck wear and tear and reduces labor and gasoline costs. [Gen. 1¼ pp. 2 ill.]

230. Memphis-Based Collector Runs Three-City Company. *Refuse Removal Journal*, 5:4:8, April 1962.

Describes the development and expansion of a refuse hauling firm which began less than 10 years ago with a small operation in Memphis, Tenn., and which now operates refuse collection services in Houston, Tex., and San Juan, P.R., as well as in Memphis. Previous experiences in the transfer business helped the embryo refuse hauling firm in making the right moves in personnel selection, credit policy, accounting procedures, maintenance methods, and the purchase of dependable equipment. The Memphis operation was first built up, after which the firm established services in Houston and then in San Juan, employing similar sales techniques in all three cities. Equipment employed is different because of the variations in conditions in the three cities. [Gen. 3 pp. 4 ill.]

231. Men of Character. *Public Cleansing*, 52:9:415, September 1962.

Part of a *Manchester Evening Chronicle* report on the men of the city's sanitation department. Interviews with the refuse collectors reveal two conditions which attract these men to their jobs—the open-air life, and the fact that if they finish their assigned tasks early they are free for the rest of the day. Several of the Manchester collectors have put in more than 40 years of service. [News. ⅔ p.]

232. Montreal Changes Collection Hours. *Refuse Removal Journal*, 6:1:18, January 1963.

The city of Montreal, Canada, has changed its refuse collection operations by contract from daytime to nighttime to avoid traffic problems, the dirty appearance of the streets, etc. The refuse contractors are now required to remove refuse between 8 p.m. and midnight during the summer and between 7 p.m. and midnight during the winter. The collection system is curbside, and households are not permitted to put out their refuse cans until 6 p.m. [News. ¼ p.]

233. Municipality Works Around the Clock. *Refuse Removal Journal*, 6:6:12, June 1963.

A detailed description of the job of refuse collector in the New York City Bureau of Cleaning and Collection. Includes training, salaries, work schedules, scrunity by supervisors, the settling of accusations against collectors, hazards involved in the job, fringe benefits (vacations, sick leave, pension plan) promotions, and alternative job opportunities. [Dec. 2½ pp. 1 ill.]

234. New Statewide Association in West Virginia. *Refuse Removal Journal*, 6:3:21, March 1963.

A new statewide association of private refuse operators, the West Virginia Refuse Haulers Association, has recently been formed in that State. Soon after formation of the new association, the members had reason to be grateful that they were organized. A bill had been introduced into the State House of Delegates under which refuse haulers would be removed from control of the State Public Service Commission. This could have been ruinous for the refuse haulers, and the newly formed association was used to voice opposition to the bill, which was eventually defeated. [News. ½ p.]

235. New System in Sioux City. *Refuse Removal Journal*, 5:7:26, July 1962.

Sioux City, Iowa, is an example of a community successfully combining the private contract and municipal systems of refuse collection. Under a new collection system, the city is supplying seven modern packer trucks which are operated by private haulers on a contract basis. The new system replaces the old system in which 11 different routes were operated by 11 contractors using open refuse trucks. The article gives the wording of the new contract which the city is using. [Gen. 1⅔ pp.]

236. "No Bed of Roses," Says Neophyte of Collections. *Refuse Removal Journal*, 5:1:18, January 1962.

An amusing and illuminating story by a Tulsa, Okla., newspaper reporter about his experiences one day collecting refuse with a private contractor. [News. 1 p.]

237. Our Public Image. *Public Cleansing*, 52:2:88, February 1962.

Stresses the importance of the public having a good image of municipal refuse collectors, and discusses two ways of achieving this: a clean appearance for refuse trucks and collectors, and driving courtesy. [Gen. 1⅓ pp.]

238. Paper Sacks Are Put Through the Mill. *Public Cleansing*, 52:2:75, February 1962.

Describes a test recently conducted in Salford, England, to determine what would happen to paper sacks containing refuse when handled by a separation plant. It was ascertained that: (1) the elevating belts will carry the sacks smoothly for delivery to the screens; (2) the sacks will be thrown about somewhat as they are passed through the screens and arriving at the picking belt they will retain only 50 percent of their refuse; (3) if a slicing device is incorporated to slit the sacks, the sacks would not be wholly emptied; and (4) if bags are to be used, it will be necessary to pass them first through some form of pulverizing machine to insure that all contents are spilled on to the conveyor belts. [Gen. 1 p.]

239. Prominent New Orleans Hauler Has Long History. *Refuse Removal Journal*, 5:9:16, September 1962.

Describes the largest private refuse hauling firm in the New Orleans, La., area, which grew out of a 91-year-old family organization that used to haul passengers and baggage under contract with the railroads. The company handles over 600,000 cubic yards of material annually from over 800 customers, including businesses, institutions, and military installations. All collection units are radio-equipped. Private contractors in New Orleans are not allowed to use municipal incinerators, so all of the refuse is deposited in the city dump. [Gen. 1⅓ pp. 3 ill.]

240. Purchase of Packer Saves Money for Kentucky Town. *Refuse Removal Journal*, 5:1:16, January 1962.

Purchase of a new compaction unit has enabled the town of Glasgow, Ky., to save over $2,400 annually in labor expenses and has provided a faster, more sanitary refuse collection service. [News. 1 p. 1 ill.]

241. Purdue Study Shows Differences in Refuse. *Compost Science*, 4:1:47, Spring 1963.

A study at Purdue University's Department of Sanitary Engineering has indicated that the quantity and quality of refuse varies throughout a city based on seasonal, economic, and population factors. The study covered a 3-year period during which refuse was sampled and analyzed from Milwaukee, Wis., Toledo, Ohio, and Bloomington and Indianapolis, Ind. The investigators set the socioeconomic boundaries on the basis of the market value of the homes. The study developed methods that would yield results 95 percent certain for a variety of sampling ratios and formulae that permit determining the percentage of carbon and hydrogen in raw garbage, the remaining combustibles, and the total combustibles. A table gives ingredients of refuse varying throughout the year and among the socioeconomic levels. [News. ⅓ p. 1 tab.]

242. Redevelopment Problems in Birmingham. *Public Cleansing*, 53:7:349, July 1963.

The paper describes refuse collection in Birmingham, England, in view of the extensive redevelopment going on in that city. [Gen. 8½ pp.]

243. Refuse Collection at Walthamstow. *Public Cleansing*, 53:12:606, December 1963.

The city of Walthamstow, England, recently reorganized its refuse collection system by replanning collection routes and replacing its side loading collection vehicles with packers. The result has been a decrease in the number of refuse trucks needed from 16 to 8. The city also boasts an excellent system of record keeping which provides the facility for comprehensive detail and speedy means of reviewing age and maintenance costs. A market which is held every morning of the week presents a special refuse problem. Eight mobile trailers are used to contain the litter and debris of the market. [Gen. 2 pp. 1 ill.]

244. Refuse Collection in Los Angeles. *Public Works*, 93:1:136, January 1962.

An abstract of a paper by Norman B. Hume and Jack I. Kerkis presented at the 1960 meeting of the American Public Works Association. Explains the refuse collection system used in Los Angeles, Calif. The city is divided into collection districts, and a supervisory employee, or dispatcher, in each district controls the activities of a number of collection crews. Each crew has a regular assigned area for which it is responsible. The driver member of the two-man collection crew is responsible for the crew's operation. If a crew finishes its assigned route ahead of schedule, it is dispatched to another area where a crew is behind schedule. The unbalancing effect of variable factors which any crew may encounter is compensated for in this manner. [Gen. 1¼ pp.]

245. Refuse Sampling. *Public Cleansing*, 53:4:182, April 1963.

Briefly compares refuse sampling in Great Britain and the United States. Refuse analysis has been practiced in Britain for the past 30 years, while it is a comparatively recent innovation in the United States. There is one basic difference between the practices in the two countries: Americans place as much emphasis upon chemical composition as physical, whereas chemical analysis does not figure at all in the procedures recommended by the British Institute of Public Cleansing. Gives the socioeconomic classifications and an alternate method of grading of residences used in the United States. Presents comparisons of refuse analyses from different income levels and housing conditions to indicate the scope of such studies. Includes comparisons of refuse analyses of similar-income workers residing in old and new houses, of these "old" houses and the same houses of 25 years ago, and of villas and luxury flats. Examines the differences in these refuse compositions and the connotations involved. [Det. 4½ pp. 3 tab.]

246. Report on Three Methods of Collection in Europe. *Refuse Removal Journal*, 5:11:16, November 1962.

Discusses three methods of refuse collection presently being used in Europe—dustless, skep, and paper bag. The dustless system is being introduced in Birmingham, England, where the skep system has previously been used, and the new method has offered several advantages over the old one, including elimination of spillage, prevention of refuse from getting wet, and improved working conditions. A comparison was made of curb, back door (by skeps) and sack collections. It was found that the paper sack collection system is more hygenic, is much more appreciated by workers, is very nearly a dustless loading system and is without the inherent disadvantages of cost and heaviness of the job involved in the skep system. Experiments have shown that sacks are suitable for winter and summer collections, and the risk of fire is small. Out of 14,000 sacks used in the experiments, there were only nine failures, and these were due to householders' attempts to overfill the sacks. [Gen. 1⅓ pp.]

247. Service to Industry Promotes Firm's Success. *Refuse Removal Journal*, 5:6:6, June 1962.

Expansion of industry in the Boston, Mass., area gave this young hauling firm the opportunity to extend its business. Six years ago the firm decided to change to the containerized system of waste collection, and its prospective customers proved receptive to the container concept. The new factories in the area were exceptionally suitable for containerization; many plants kept containers on or beside the loading docks and a number of caster-mounted boxes in the interior. Most of the firm's refuse-collecting units consist of two-man, uniformed crews, and there is a very close relationship between the crews and the management. [Gen. 1⅔ pp. 2 ill.]

248. Setout, Setback Service Costs Toledo $333,000/Year. *The A P W A Reporter*, 29:7:20, July 1962.

A study was recently made to see how well the newly installed once-a-week, combined garbage and trash collection system in Toledo, Ohio, was working. It was found that the cost of handling one ton of refuse was $13.40 for pickup and $3.64 for haul for the year 1960. It was also estimated that if the pickup and return of cans by the collectors was deleted, $333,000 would be saved by the city. [News. ½ p.]

249. Single Packer Does Air Force Base Job. *Refuse Removal Journal*, 6:2:22, February 1963.

This company handles all the garbage and refuse from 1,500 homes on the K. I. Sawyer Air Force Base near Marquette, Mich., using only one refuse compaction truck and a three-man crew. [Gen. ⅔ p. 1 ill.]

250. £60 In Tips. *Public Cleansing*, 52:6:272, June 1962.

A bachelor of science who temporarily took a job as a refuse collector tells all about his experiences. Describes the men he works with, the working conditions, the rubbish which is salvaged from the dustbins, and the attitudes and feelings of refuse collectors while working on the job. [News. 2 pp.]

251. Stationary Packer Aids Michigan Plant Disposal. *Refuse Removal Journal*, 5:10:12, October 1962.

Great savings in refuse handling costs have been realized at a plant in Jackson, Mich., through the installation of a new and revolutionary refuse compactor. The compacting system consists of a stationary compactor which develops 45 tons of pressure, an enclosed container, and a number of tilt carts which are placed at points of refuse accumulation. All refuse dumped into the compactor hopper from tilt carts or other refuse storage containers is automatically crushed and compacted into the large carry-away, rolloff container. Trips to the dump have thus been reduced from two and three times each day to once every 4 days. [Gen. 1½ pp. 5 ill.]

252. Successful Meeting of California Council Held. *Refuse Removal Journal*, 6:3:22, March 1963.

An account of a February 1963, meeting of the California Refuse Removal Council. Nearly 100 operators and suppliers from all over California, and even some from Nevada attended the meeting. The purpose of the meeting was to present a progress report on statewide and national activities, to reaffirm the purpose of the organization, to secure continued industry support, and to review progress reports of membership, bylaws, and ways and means committees. Also a board of directors was created and the name of the association was changed from California Waste Removal Council to the name cited above. [News. ⅔ p.]

253. They Want a Night Collection. *Public Cleansing*, 52:10:471, October 1962.

Residents of Halifax, Canada, are complaining about refuse collection on two accounts—the need for householders to place their refuse containers on the curb, and the progress of refuse collecting throughout the day. Not only do they want their cans collected from the refuse can site on their propties, but they want it done during the night. The article, however, points out the fact that refuse bins are not standard sizes, that householders often fail to bundle their cartons, and that night collections would cause much more of a disturbance to residents than day collections. [News. ½ p.]

254. $35,000 Sack Study in the United States. *Public Cleansing*, 52:11:512, November 1962.

Reprint. (See item No. 35.) [News. 1 p.]

255. A "Train" System for Residential Collection. *Refuse Removal Journal*, 5:6:10, June 1962.

A new approach to residential refuse collection has been iniated by a Florida contractor who serves the communities of Daytona Beach and Eau Gallie. Large packer trucks have been replaced by small pickup trucks each pulling three 3-yard refuse containers mounted on their individual pneumatic-tired trailers. Each "train" is moved down the street until all three of its containers are filled with refuse. It then makes a rendezvous with a "mother truck," a 20-cubic-yard compaction truck which picks up each of the three containers, empties the refuse into the compaction body, and returns the containers to be used again. In this manner, one mother truck can service four to five trains. Advantages of the newly initiated train system include reduction of noise during collection in residential areas and substantial savings in fuel, maintenance, and labor expenditures. [Gen. 1½ pp. 1 ill.]

256. A "Train" System for Residential Collection. *Proceedings of the Wyoming Seminar on Solid Waste Collection and Disposal*, p. 52, April 1963.

Reprinted from an article which appeared in the June 1962 issue of *Refuse Removal Journal*. See item No. 255. [Gen. 1½ pp. 1 ill.]

257. 24 Men Make 19,000 Pickups Every Week. *Refuse Removal Journal*, 6:6:15, June 1963.

Briefly describes the refuse collection service in Grand Prairie, Tex. The sanitation department employs 24 men, one 16-cubic-yard packer, and four 20-cubic-yard packers to make twice-weekly pickups from over 9,000 residences and commercial establishments. [News. ⅓ p.]

258. Two-Way Radio Cuts Truck Time, Mileage for Chicago Hauler. *Refuse Removal Journal*, 6:11:30, November 1963.

Describes the use of the two-way radio system which coordinates industrial refuse operations for a refuse hauling company in the Chicago, Ill., area. Central control of the radio system is handled at the company headquarters. There, the secretary-dispatcher operates a 60-watt base station to establish contact with drivers in radio-equipped vehicles. To insure pickups are made promptly, the dispatcher maintains contact with drivers as they make their rounds. Requests for special service are quickly relayed to the drivers who then make the calls. Radio is also used to route drivers of the load-lugger trucks as they pick up industrial waste and scraps from manufacturing plants, and to coordinate the collection of solid fill and rubble at construction sites. [Gen. 1½ pp. 3 ill.]

259. Washington Firm Misses No Chance for Service. *Refuse Removal Journal*, 5:5:8, May 1962.

Describes the operations of a Washington, D.C., refuse hauling firm which serves customers in nearby Maryland and Virginia as well as the Nation's Capital. The company employs from 45 to 50 people, 10 of whom work principally in the office. Field operations are containerized as much as possible, and at present 24 packers and 6 open trucks are used. The majority of the fleet is radio-equipped so that headquarters can keep in close contact with the field units. Any complaints received are immediately investigated and corrected, and if a complaint is the result of the negligence of an employee $2.50 is docked from his pay check. The firm also has an incentive system for employees: any crew member who sells a new customer on the refuse service receives a commission, and prizes are given to the employee who does the best job of maintaining his truck. [Gen. 2 pp. 2 ill.]

260. Washington Firm Shows the Way to Efficiency. *Refuse Removal Journal*, 5:12:6, December 1962.

Describes a refuse hauling firm in Washington, D.C. The company whose fleet has grown from 3 antiquated trucks to 60 modern vehicles grossing more than $1 million annually, has scored a number of firsts in the refuse hauling business. It was the first company in Washington to equip its fleet with two-way radios, supply detachable metal trash containers to commercial customers, employ a full-time safety director, engage a consulting engineer, and the firm may have been the first in the world to hire consulting psychologists for studies of its executives and company goals. [Gen. 3 pp. 3 ill. 1 tab.]

261. West Coast Hauler Swaps Policies for Pickups. *Refuse Removal Journal*, 5:2:16, February 1962.

A brief description of a refuse collection company in Palo Alto, Calif. The company works for the city under a unique contract: sanitation service is provided residents as another utility; residents are billed for the service on a comprehensive statement which covers all their utilities; and the city provides the disposal area. Preventive maintenance and good public relations are of prime concern for this company. Each refuse unit is cleaned and strategic working parts are greased and oiled after each working day, resulting in minimal maintenance costs and downtime. All customers receive promotional booklets which describe the refuse service, and the company employs only clean and courteous personnel. [Gen. 2 pp. 3 ill.]

262. Year of Progress in Manchester. *Public Cleansing*, 52:4:151, April 1962.

Discusses some of the problems and changes occurring in refuse collection in Manchester, England. During the year ending March 31, 1961, there was an increase of 1,000 tons in refuse collected. City officials have been contemplating the reduction of both team and vehicle size in areas of terraced property which in many instances have wide passages giving access to the rear of houses. Manchester is experiencing an extreme labor-turnover problem; in 1 year 732 men entered the service and 746 left, of whom 400 had less than 3 months' service. Also discusses the problem of the ever-changing density and composition of refuse making sani-

tary landfilling difficult, the need for increasing refuse bin capacity in Salford, England, and the declining prices of salvable materials. [Gen. 4½ pp.]

Avery, H. C., Jr.

263. Cents, Scents and Sense of Sanitation. *The American City*, 77:11:106, November 1962.

Describes the installation and features of the containerized municipal refuse collection system in Midland, Tex. In the spring and summer of 1961, Midland received an abundant rainfall which caused the amount of grass cuttings to be collected to soar. The city's collection service was buried under the excess and the number of complaints from citizens rose sharply, prompting expansion of the collection fleet. The city purchased two hundred and eighty-nine 3- and 4-cubic yard containers and three hoisting units and is now realizing a $55,000 annual savings on labor expenditures. [Det. 2½ pp. 4 ill.]

264. Midland, Tex. Finds Containers Invaluable. *Refuse Removal Journal*, 6:3:6, March 1963.

The city of Midland, Tex., recently increased its refuse collection service and simultaneously reduced its sanitation labor force by 12 and expenditures by $55,000. Two reasons were cited for this: the installation of the container system for commercial refuse collections; and help received from the citizens of Midland. The article describes the container system and discusses some general aspects of refuse collection in the city. [Gen. 2⅓ pp. 2 ill.]

Building Research Station, Garston, Herts.

265. Refuse Disposal in Blocks of Flats. Building Research Station Digest (second series)—40. London: Her Majesty's Stationery Office, November 1963. 6 pp. 4 d.

Summarizes the results of experiences derived from the use of four main systems of refuse disposal in blocks of flats or maisonettes. The systems studied were: (1) the ordinary dustbin system; (2) communal containers; (3) chutes; and (4) the Garchey system. Includes: the composition of the household refuse used in the experiment; the householders' routine concerning the time and frequency of refuse deposits and preparation before deposit; disposal capacities of the four systems; the desirable average disposal capacity for a system; reasons for this capacity to be greater for the chute system than for the other systems; comparison of the costs of the disposal systems (capital and running costs); equipment used and tenant satisfaction with each of the systems; discussion of the systems; and future developments. [Det. 5 pp. 3 tab.]

Canadian Municipal Utilities Staff

266. Using Packer Equipment To Lower Costs Gives Better Service Too. *Canadian Munincipal Utilities*, 100:6:15, June 1962.

While the use of more modern equipment in refuse collection is increasing, the open truck is still employed in many communities. To defend the old-fashioned and unsanitary equipment, municipal officials usually advance a number of reasons for continuing the system; but the reasons hardly seem to be valid when a study of available facts indicates an overwhelming case in favor of packer-type collection equipment. *Canadian Municipal Utilities* has made such a study examining "in-the-field" operations in representative Ontario municipalities. This feature report sets out the facts obtained from the study. Numerous variables affecting the refuse collection system make it almost impossible to compare operations in various communities. This study, however, takes an average of 20 Ontario communities, thereby making data more useful. These include 15 towns in the population range of 11,500 to 76,000, and 5 in the range of 100,000 to 264,000. The article gives information about wage rates, refuse collection costs per capita, equipment used, comparative costs of contract collection in communities of different sizes, and comparative operational costs for the packer unit and the open truck. Emphasis is placed upon the advantages of the packer truck, which include lower operational cost, fewer trips to the disposal area, smaller crews, less strenuous work for the crews, and more sanitary conditions. Concludes with excerpts of interviews with crewmen who were using packer equipment. [Det. 7 pp. 12 ill. 2 tab.]

Carr, Robert S.

267. $600,000 Saved Annually. *The American City*, 77:5:85, May 1962.

Describes the intensive study which was conducted before the city of Orlando, Fla., decided to rebuild its refuse collection service. To fulfill the objectives of the project (twice-a-week carryout garbage service and curb-side pickup of yard trimmings and trash for 36,000 residences, and containerized service for all commercial firms), the purchase of 20 front-end-loading packers and 1,100 enclosed steel containers was recommended. Describes the new collection service, which is realizing a $600,000 savings in labor and equipment costs for the city. [Gen. 2⅔ pp. 5 ill.]

Cottrell, W. F.; and Young, K. E.

268. Tote Barrels. *The American City*, 78:5:117, May 1963.

Describes recent changes in the municipal collection service in Middletown, Ohio. Elimination of the collection fee, increased the number of residential customers by 62 percent, but only one additional crew was needed because of the change-over to the carry-barrel system. Collectors were supplied with 32-gallon, rubber-plastic barrels in which to transport residential refuse from backyard storage containers to the collection trucks. The city has also replaced many of its small packers with larger compaction trucks, reducing the number of trips to the landfill, and is now providing a containerized system for refuse collection at commercial pickups. [Gen. 1⅔ pp. 3 ill.]

Danforth, Herman L.

269. The Train-Transfer System of Refuse Collection. *1963 American Public Works Association Yearbook*, p. 211.

In recent years detachable containers have practically revolutionized refuse collection from commercial establishments but have done little for residential collection. The city of Tucson, Ariz., has, however, put into use a train-transfer system whereby the residential community is serviced by four trains of detachable containers and two 24-cubic-yard refuse transporting trucks. The containers of 4- or 5-yard capacity and equipped with wheels and a tongue are pulled by some light towing equipment, such as a Jeep or a Scout. Several of the containers are strung along together, making up the train. When full, they are emptied by a large packer with a device to lift and dump the containers. The city has found that for top efficiency the packers should go to the trains, rather than the trains to the packers. Advantages of the system include greater flexibility and reduction in noise, fuel consumption, and vehicle maintenance costs. [Gen. 3 pp.]

Davies, A. G.

270. Dustless Collection in Multistory Buildings. *Public Cleansing*, 52:7:302, July 1962.

Briefly discusses a dustless refuse collection system multistory buildings. Each apartment has a dustless bin, emptied down a chute by refuse collectors directly into the vehicle at the base of the chute. Transport can be by trailers or ordinary vehicles, and the chute can be of ample dimensions. No spillage, chokages, or fouling of the chute, are claimed to be among the advantages. [News. 1½ pp. 1 ill.]

Downing, G. L. A.

271. Living in High Flats—Problems of Tenants and Management. *Royal Society of Health Journal*, 83:5:237, September–October 1963.

A very short discussion of the disposal of waste products in tall apartment buildings. The dustbin and the dustcart still dominate the storage and collection of refuse. The chute system, almost universal in tall blocks, is by no means satisfactory, giving rise to complaints of noise, smell, blockages, and misuse. Multibin storage in specially constructed chambers at the base of the chutes, now being experimented with by some authorities, undoubtedly helps. There is still something to be said for housing the containers away from the dwellings in dust-free refuse kiosks and supplying tenants with covered metal or plastic pails which may be emptied as required. In whatever way the technical breakthrough comes, a complementary system of storage and collection of bulky articles will always be necessary. It is probably this factor, together with the high cost of installing and maintaining a waterborne system, that prevents authorities from more adventurous experiment in this field. [Gen. ½ p.]

Eimon, Pan Dodd—Editor

272. Mpr Smooths the Way for Sanitary-Service Changes. *The American City*, 77:7:163, July 1962.

Describes the successful public relations campaign conducted by the city of Glendale, Calif., during the consideration of the municipal rubbish and garbage collections into a single collection. The goals of the seven-point campaign were to get the citizens to buy uniform rubbish containers and to wrap their garbage. The seven points included the distribution of leaflets, newspaper advertisements, articles in the city's newsletters and newspapers, reminder notices attached to utility bills, and personal visits to commercial establishments and some residences. [Det. 1 p.]

Jennings, S.

273. Sanitation in High Buildings. *Royal Society of Health Journal*, 83:2:77, March–April 1963.

Includes a very brief discussion of refuse disposal in apartment buildings. Refuse chutes are still being used, but not properly in most cases. They are often fouled when wet refuse is emptied down them and continually blocked by cardboard cartons. The Garchey system, which appeared at one time to have died from lack of support, may still have something to offer to tall buildings. Considerable research carried out by the patent holders has indicated that with the new sink receiver unit branch lengths up to 30 feet can be made self-cleaning and that no difficulties arise from the drop of refuse in the stack. The cardboard and paper problem remains, but it is not bad, as the Garchey unit can deal with many things that cannot be disposed of through a sink waste grinder unit. [Gen. ½ p.]

Jorden, John C.

274. Dustless Refuse Collection in the City of Birmingham: A Progress Report. *65th Annual Conference of the Institute of Public Cleansing*, June 17–21, 1963.

An extensive report on the development and progress of dustless refuse collection in Birmingham, England. Describes: (1) The pilot scheme—location, vehicles and dustbins used, and progress of the scheme. (2) Extension of the system in the Lifford district and other areas of the city after the pilot scheme had completely fulfilled all expectations. Explains the procedures used for bringing a new round into operation on the dustless collection system. Describes: the dustbins and bin trolleys used; including schematic diagrams of the equipment in the appendix; collection vehicles; the collection of bulky wastes and trade refuse; and protective clothing issued to refuse collection personnel. (3) Reactions of the public to the new dustless system. (4) Reactions of the collection personnel to the system. (5) Financial implications in installing dustless collection. Also includes specimens of the letter distributed to householders when the new dustless bins were delivered, the round list, and the cards left at premises by the refuse collectors. A table presents the general data and costs relating to the new dustless system in Birmingham. [Det. 26 pp. 2 diag. 2 tab.]

Keithley, Jerry
275. Refuse Removal Program Emphasizes Quality Service. *Western City*, 39:2:27, February 1963.

In the fall of 1960, the Palo Alto, Calif., Department of Public Works began an intensive study of alternative methods of refuse collection then available to the city, including municipal, contract, and franchise (or private) collection. Final recommendation was that the city attempt to negotiate a contract collection method based on specifications established by the public works department. This contract contains some unique features: the city continues to provide and operate the disposal area and customer billing; the city retains 20 percent of the refuse charges to finance billing and supervision; the sanitation company handles all other aspects of refuse collection and transportation: minimum service to single family residences is once a week with rear-yard collection from two 32-gallon cans of combined refuse at a cost of $1.60 per month. Commercial and industrial customers receive the same service, while apartments receive this basic service to a single 32-gallon can once a week for $1.20 a month; the sanitation company supplies new uniforms, equipment, and operation center. [Det. 1¼ pp. 1 ill.]

Knowles, Virgil C.
276. We Save 37 Percent on Refuse Collection. *The American City*, 77:1:90, January 1962.

Describes the refuse collection srevice in Oak Park, Mich. The city has realized many advantages in changing from municipal to private contract collection: net savings have been $43,000 per year, and more labor is now available for other public works such as sewer cleaning, sign repairs, and road maintenance. A table shows collection cost savings. [Det. 2 pp. 2 ill. 1 tab.]

Lucas, Harley E.
277. Almost Everyone Volunteers. *The American City*, 77:7:31, July 1962.

Briefly describes the municipal refuse collection service in Hays, Kans. The service is on a voluntary basis for a single-family fee of $1.50 monthly. The city operates two compaction refuse trucks of 13- and 16-cubic yard capacities. [News. ½ p. 1 ill.]

McCarthy, F. St. L.
278. Clean and Quiet. *Public Cleansing*, 52:12:565, December 1962.

A lengthy discussion of cleanliness and quietness in refuse storage and collection. Includes: (1) requirements of cleanliness and hygiene which a method of refuse storage and collection should meet; (2) problems involved with setting standards of quietness. Although there has been difficulty in specifying a standard permissible noise level, research has suggested that anything exceeding a level of 80 decibels may be considered a nuisance; (3) unsanitary and noise problems resulting from present refuse storage methods used in Great Britain, including the dustbin, bulk container, and chute systems. Gives sound level recordings of lids being dropped down refuse chutes, and discusses at length the cleaning of bulk containers; (4) advantages and disadvantages of adopting a system of dustless collection. One of the principal disadvantages which is extensively discussed is the excessive weight of the dustless bin. Describes developments in the creation of lightweight bins made from light alloys and plastics and combinations of steel and these materials; (5) advantages and disadvantages of paper sacks for refuse storage; (6) comparative costs for the installation and operation of the dustless paper sack, and dustbin systems for 1,000 properties in a residential area; and (7) cleanliness and quietness in refuse collection vehicles. Discusses vehicle body design, bulk container vehicles, atmospheric pollution by vehicles, and noise created by the refuse vehicle motors and auxiliary mechanisms. [Det. 16 pp. 3 tab.]

Mendoza, Ed
279. Factors in an Efficient Refuse Collection System. *Public Works*, 94:1:128, January 1963.

Describes the highly efficient refuse collection system in San Diego, Calif. The citizens are expected to assist in collection in several ways, among which are placing refuse cans at the curb before 8 a.m. and obeying the city specifications regarding the refuse cans. The city uses an incentive system for refuse collection personnel; crew members are allowed to quit work at 3:15 p.m. instead of the regular 4:30 p.m. if their routes have been properly collected. This insures that the collectors work at a reasonably rapid rate without having the need for large numbers of supervisory personnel watching them. The sanitation division maintains radio contact with its eight field foremen so that any complaints or inquiries can be answered quickly and effectively. [Gen. 2 pp. 1 ill.]

Morse, Roy W.
280. Good Contract Collection. *The American City*, 78:9:191, September 1963.

Describes the new contract refuse collection service which covers 310,800 people in the Seattle, Wash., area. The firm is part of a larger company whose headquarters are located in Barrington, Ill., and which operates over 120 refuse trucks in 16 cities and communities. The city pays the contractor on a population basis at the rate of $4.10 per capita per year for the first year, with 5 cent increases for each of the next 4 years. The contractor will also get reimbursed for 60 percent of any wage increases granted the collectors. The major change brought to Seattle by the contractor was a new collection schedule. [Gen. 1½ pp. 2 ill.]

Owens, Arthur S.

281. Trading Roses for Trash. *The American City*, 78:4:17, April 1963.

A 2-day Christmas holiday, a snow storm, and extra-heavy accumulations caused weekly refuse collections to fall behind schedule in Roanoke, Va. To regain public confidence in the city services, sanitation department employees delivered personal apologies to the residents who complained about the slow collection, and exchanged roses for their refuse accumulations. [News. ½ p. 1 ill.]

Roff, Bob

282. Why Contractors Join Associations. *Refuse Removal Journal*, 6:10:12, October 1963.

Briefly states why refuse contractors join associations. As individuals the contractors will lack the strength to remedy the future problem of lengthy haul distances to disposal areas, but as a group they will have the strength and ability to secure adequate disposal facilities. Through the rules of the refuse contractor associations, standards in the industry can be raised to reflect the importance of the industry to the overall economy of the area. The associations will make it possible to realize savings in group purchasing of trucks, equipment, and insurance. [Gen. ¼ p.]

Rogers, Allan H.; and Lockwood, Robert K.

283. Paper Bags for Household Refuse Handling. American Public Works Asociation Research Foundation Project 115. Chicago: *American Public Works Association*, August 1963. 39 pp.

A report on a study of the feasibility of using disposable kraft paper bags for handling household refuse. Gives a thorough description of the research project. Includes: background material; scope of the program; initiation of the tests; and results of the project with respect to the sanitation, convenience, and economy of the system. Appendices give the following information for each of the four areas where tests were conducted: population; collection and disposal data; route characteristics; weather test period; animal problems; other bag damage; bag failure; lost collection time; collection weights; route time; stop time; truck conditions; dumping; labor; charges; initial pretest canvass; complaints; press coverage; posttest survey of participants reactions to the system; posttest canvassers' remarks; official city reaction; and observations. In setting up the program, attention was directed toward getting varied climatic and seasonal conditions, a reasonable geographical distribution, type of collection, and some range of class and type of dwelling. Cost investigations were attempted, but it was not possible to draw reliable conclusions in the series of tests. On the basis of the findings of the study, it was concluded that the disposable kraft paper refuse sack system is a step in the right direction and one worthy of serious consideration by municipalities. [Det. 39 pp. 6 ill. 1 tab. 12 ref.]

Rogus, Casimir A.

284. Refuse Collection and Disposal in Western Europe. Part I. *Public Works*, 93:4:98, April 1962.

A discussion of refuse collection and street cleaning in Western Europe, comparing these operations with those in the United States. The topics included in the discussion are: (1) quantity of refuse produced—range and median; (2) composition and properties of refuse—percentage of dust, putrescible matter, paper, metals, textiles, bottles, broken glass, bones, combustible, and noncombustible debris, and density, potential salvables, total moisture, and calorific value; (3) collection responsibility; (4) collection characteristics—frequency, seperate or combined, and point of pickup; (5) refuse containers—size, ownership, maintenance, use of standard size and fully covered containers, empty weight; (6) collection labor; (7) street litter; and (8) snow and ice control. These conclusions are reached: (1) European refuse production and litter is less; (2) European wage scales and fringe benefits are one-third less; (3) European market for salvables stimulates reclamation of waste; and (4) European development and use of refuse receptacles is more advanced than that in the United States. (See items No. 285 for part II, No. 375 for part III, and No. 645 for part IV.) [Det. 6 pp. 5 ill 5 tab.]

285 Refuse Collection and Disposal in Western Europe. Part II. *Public Works*, 93:5:99, May 1962.

A discussion of refuse collection practices in Western Europe. Includes: (1) organization; (2) routing; (3) incentive wage systems; (4) collection costs; (5) collection equipment; (6) the Hermetic, or dustless, collection system; and (7) tractive powers. Also briefly discusses street cleaning and snow and ice control. Tables give collection performances and costs, and collection truck data. (See items No. 284 for part I, No. 375 for part III, and No. 645 for part IV.) [Det. 6 pp. 7 ill. 2 tab.]

Savage, Eldon P.

286. Economical Pamphlets on Refuse. *The Journal of Environmental Health*, 25:1:39, July–August 1962.

Provides a four-page model pamphlet entitled, "Garbage and Trash Collection and Storage," which can be used by local health departments to reproproduce refuse pamphlets for the education of citizenry in proper refuse handling. Describes the pamphlet, the process by which copies can be reproduced, and various methods for distributing the pamphlets. [Det. 3½ pp. 1 ref.]

Schwartz, A. M.

287. The Backache Problem. What to Do About It. *1963 Sanitation Industry Yearbook*, p. 36.

Discusses the backache, one of the commonest causes of disability to the refuse collector. Briefly describes: the anatomy of the back; what is meant by the term "backache;" some of its causes and symptoms; treatment for both mild and severe back injuries; the proper method of lifting refuse containers to prevent injuries; and home remedies for the backache. [Gen. 1½ pp.]

Shoemaker, Joe; and Patten, Harold

288. Take Your Clippings to The Store. *The American City*, 77:7:31, July 1962.

The city of Denver, Colo., has a unique grass-clippings collection service. Instead of sending trucks around to the individual residences, nine 20-cubic-yard compaction trucks are stationed at six selected shopping centers on Saturdays during the grass-cutting summer months. Residents merely bring their clippings to one of the shopping centers, certainly a simpler task than hauling to an outlying landfill. In addition to meeting with widespread public approval, this unique service is also saving the city money in refuse collection costs. [News. ½ p.]

Smith, Carl D.

289. Flyless Refuse Collection. *The American City*, 78:12:81, December 1963.

Based on a paper which appeared in the *1963 American Public Works Association Yearbook*. (See item No. 66.) [Gen. 1 p. 1 ill.]

Stallings, K. B.

290. An Unseasonable Winter. *The American City*, 78:11:33, November 1963.

A very harsh winter in 1962–63 in which temperatures dropped to 15° below zero killed all the hedge and the majority of the evergreens in Nashville, Tenn. Property owners waited until the last week in March to see whether their shrubbery would show signs of life and then started cutting. The city public works department had to use 4 chippers and van-type trucks, and 12 chipper crews, each working 60 hours a week, to remove all of the brush by the end of May. [News. ⅔ p. 1 ill.]

Stephenson, J. W.

291. Collect Refuse—Not Complaints. *The American City*, 78:10:97, October 1963.

Gives recommendations which, if followed, will make a refuse collection system sanitary and satisfactory. The pointers cover these subjects, among others: the refuse collection truck; frequency of collections; what to include in a contract between city and refuse collector; materials collected; point of pickup; collection procedures; disposal; public relations; damage to property. [Gen. 8 pp. 4 ill.]

Tagg, Joseph J.

292. City Establishes Profitable Refuse Collection System. *Public Works*, 94:6:100, June 1963.

Briefly describes the recently improved refuse collection service in Miramar, Fla. Two 23-cubic-yard packers were obtained on a lease-purchase basis, the city was divided into three sections and routes were laid out for each truck, land for a sanitary fill was obtained, and citizens were informed by letter of the new service. [Gen. 1 p. 1 ill.]

Tope, O.

293. Silence! *Public Cleansing*, 53:7:323, July 1963.

A discussion of the noise problem created by mechanized refuse collection and street sweeping. Briefly outlines a four-point plan to cut the noise of sanitation activities: (1) municipal sanitation vehicles should be subjected to noise annoyance tests before being accepted; (2) manufacturers should be made by law to produce vehicles which will be of such a noise level that no disturbance of well-being and health shall be inflicted upon human beings with normal sensibility; (3) controlling authorities should be compelled to use strict measures and should not bestow on manufacturers any exceptions; and (4) only such dustbins that cause the slightest possible disturbance should be used. [Gen. 2 pp.]

Warner, William P.

294. Better Refuse Collection for Less Money. *Public Works*, 93:12:70, December 1962.

Describes the renovation of the municipal refuse collection service in Lakeland, Fla. The city's plan was to provide a better service through more frequent, regularly scheduled collections using enclosed collection equipment, and to reduce cost by combining trash and garbage collections and replacing and expanding the commercial container system. Seven garbage and 13 trash trucks were replaced by 8 modern 20-yard rear-end loading packers for residential collection, and three 20-yard overhead-loading packers and 256 containers were added to the commercial collection fleet. Annual net savings are approximately $95,000, and the new equipment should be paid for out of the savings by September 1964. [Gen. 1½ pp. 2 ill.]

295. Update Refuse Collection and Save. *The American City*, 78:1:94, January 1963.

Describes the two-step modernization program of the Lakeland, Fla., refuse collection system. In the first step, eight 20-yard packers replaced 13 trash trucks and 7 garbage trucks. In the second stage, the containerized commercial collection system was expanded by the addition of three 20-yard packers and 256 containers. The previous separate garbage and trash collections have now been consolidated into one, and collections are more frequent and on a regularly scheduled basis under the new system. The city comptroller expects to pay for the modernization program out of savings realized from the system. [Gen. 2 pp. 4 ill.]

Webb, Arthur J.

296. Municipal Accident Prevention. *The American City*, 77:1:105, January 1962.

Describes the efforts in municipal accident prevention of the East Bay Municipal Utilities District, Oakland, Calif. The foundation of the program is basically a desire shared by the general manager and utility laborer alike coupled with knowledge, communications, and teamwork. The program uses driver training courses, reports, summaries, posters, job inspections, "hard hats", safety glasses, safety-toed shoes, and guards on machines. Many foremen hold weekly safety conferences with their men. A new, more effective method of accident investigation is being employed. Results of the program have been dramatic: a reduction in serious injuries each year from 60 to 3, in cases requiring medical attention from 350 to 144, and a $50,000 annual decrease in insurance expenditures. [Gen. 1½ pp.]

Wood, C. W.

297. Future of the Lead Acid Traction Battery. *Public Cleansing*, 52:5:218, May 1962.

The electric vehicle has long been established in the field of public cleansing. The fact that in recent years the larger type of electric refuse collection vehicle has been replaced by diesel or petrol has not been due to unsuitability, but rather to the fact that manufacturers were unable to economically make the many special vehicles called for by sanitation officials. New ideas under consideration for refuse collection, and the use with electric vehicle chassis of vehicle bodies may overcome this difficulty. The article briefly discusses the most recent developments in the traction battery, factors which will have an important influence on the use of traction batteries in the future, advantages of the battery electric unit, strength of the traction battery, and design of the battery. [Gen. 3 pp.]

G. TRANSFER AND TRANSPORTATION OF REFUSE

Anonymous

298. Big Trailers Hold the Key to City's Problem. *Refuse Removal Journal*, 5:9:18, September 1962.

Describes refuse disposal operations in New Orleans, La. Most of the city is below the level of the Mississippi River, which makes impossible landfilling as it is known in other sections of the United States. New Orleans has three incinerators—two 400-ton-per-day units and one 30-ton-per-day unit. Because of the limited capacity of the 30-ton incinerator unit, much of the refuse brought to it must be transported to the city dump. The city recently replaced 30 open trash trucks with two 53-cubic-yard compaction trailers for this job, and substantial savings have been realized. Through the use of the containerized system, the city can dispose of noncombustible materials and ash residue. The city employs eight 40-cubic-yard containers and two hauling units for this task. [Gen. 2 pp. 2 ill.]

299. Bulk Transport Considerations. *Public Cleansing*, 53:6:266, June 1963.

A general discussion of the development, present status, and future possibilities in the bulk transportation of refuse. A joint disposal scheme introduced by East Ham, Ilford, West Ham, and Barking was probably the first recorded instance of the use of the bulk transport vehicle for the transport of refuse comparatively long distances. A future development may be the use of huge trailers, perhaps 60 feet in length and with a maximum width, for hauling refuse on scheduled routes during the night hours. [Gen. 2½ pp.]

300. Dinosaur Transport Solves a Cleansing Problem. *Public Cleansing*, 53:11:550, November 1963.

The Dinosaur system of containerized refuse removal is felt by many authorities in Great Britain to be too massive and expensive for general adoption in that country. The city of Glasgow, Scotland, however, has replaced rail transport of residue from its Kelvinaugh Works with a Dinosaus transport system, resulting in a savings of £15,000. [Gen. 2 pp.]

301. Off the Rails—to Save Cash. *Public Cleansing*, 52:2:95, February 1962.

The city of Glasgow, Scotland, has had to revise its refuse transportation system with the recent increase in British Railways rates. The city had been transporting residue from its various disposal works and street sweepings by rail, but it is now operating 5 collection vehicles and 15, 20-cubic-yard containers for the job. [News. ⅔ p.]

302. Prepacked Refuse Increases Payload. *The American City*, 78:8:82, August 1963.

Describes the Maximum Payload system of refuse transfer used by a refuse-disposal contractor in the borough of Hammersmith, London, England. The system employs a stationary compaction unit consisting of two main circular chambers—a top-loading receiving chamber, and a compression chamber. Refuse is loaded into the receiving chamber by a dozer or front-end loader. When the chamber is full, a piston forces the refuse into the compression chamber until a cartridge of desired weight is formed. The transport vehicle, with rear door open, is backed against, and attached to the discharge end of the compression chamber. A packing ram pushes the refuse cartridge into the truck. At the disposal site, an injection piston in the truck pushes the refuse cartridge out of the truck body. The cartridge has a maximum length of 21 feet and a diameter of seven feet. [Gen. 1 p. 3 ill.]

303. Refuse Compression at Tranfer Stations. *Public Cleansing*, 53:3:109, March 1963.

Describes the new MPL refuse transfer system developed by a British firm. Heart of the system is a giant cylindrical press, containing two adjoining sections—a charging chamber, and a compression chamber 7 feet in diameter within which a close-fitting piston operates. Refuse is dumped at the transfer station on a platform located above the press body. A sliding door closes the hatch and a piston movement transfers the refuse into the compression chamber where it is compacted under extremely high pressure. Several charges are needed to fill the chamber. The refuse is compacted into a cartridge weighing up to 14 tons which is then pushed into a specially designed cylindrical vehicle for transfer to the disposal site. The plant is equipped with a control cabin in which the weight and length of the refuse cartridge being formed is carefully observed. The time taken to produce one cartridge and transfer it to the vehicle averages about 40 minutes. Gives vital statistics of the press unit and transport vehicle. [Det. 3½ pp. 2 ill.]

304. A Special Version of a Neville Tipper. *Public Cleansing*, 52:12:544, December 1962.

A new vehicle to be used for transporting screened dust from refuse disposal plants has been developed. The truck features a series of aluminum alloy doors for top-loading of the dust. The doors, which are hinged and retained in both the open and closed positions by an over-center spring mechanism, can be operated by hand with a simple hook device, and they act as a hopper extension, guiding dust into the truck and preventing spillage. The truck can carry ten tons of refuse and can be loaded in 6 minutes and unloaded in 3. [News. 1½ pp. 2 ill.]

305. With Boats in the Basement. *The American City*, 78:5:29, May 1963.

Most of the refuse in London, England, is now disposed of at a new 200-acre site 24 miles down the Thames River which will serve the metropolitan area for the next 80 years. The refuse from the collection trucks is transferred into barges at the New Wallbrook Wharf. Refuse is dumped through holes in the floor to barges underneath. The "basement" of the depot building lies at water level and can accommodate three barges at one time. Adjoining the depot building is a seven-story administrative structure. [News. ¼ p.]

Bowerman, F. R.

306. Engineer Discusses the City Transfer Station. *Refuse Removal Journal*, 6:1:10, January 1962.

Reprint. (See item No. 307.) [Gen. 1⅓ pp.]

307. Municipal Refuse Transfer Stations. *1962 American Public Works Association Yearbook*, p. 191.

A discussion of the refuse transfer station operated by the Los Angeles County Sanitation District. At the station, collection trucks dump their loads directly into nonpacking trailers having a capacity of 60 cubic yards each. Two trailers are hauled in tandem by each truck tractor, 22 miles to the landfill site. Here refuse is pulled out of the trailer bodies through a cable pulloff system. (See item No. 306.) [Gen. 3½ pp. 4 ill.]

Grindrod, J.

308. Modern Weighing Methods Speed Refuse Disposal. *Public Works*, 94:1:74, January 1963.

In order to speed up its refuse collection and reduce clerical work to a minimum, the Wandsworth Borough Council, London, England, has installed a weighing information system which records and analyzes details of vehicles emptying their loads at the refuse transfer station. Analysis of the tonnage record is used as a basis of payment to the contractor who transports the refuse by barge to its ultimate disposal point, and for the charges made by the council to private persons or companies who use the transfer station facilities. The article describes the operation of the weighing system. [Gen. ⅔ p. 1 ill.]

Karolevitz, Bob

309. Transfer Stations Replace Limited Maintenance Dumps. *Public Works*, 94:4:91, April 1963.

A major refuse disposal improvement program which will replace multiple dump sites with a single primary disposal area and provide a series of transfer stations near population centers is being conducted in King County, Wash. Concentration of activity at a single disposal site will greatly improve health and sanitation conditions, and it is hoped that disposal costs will be reduced. The article describes the planning considerations, disposal sites, transfer stations, and trailer design. [Det. 3⅔ pp. 4 ill. 1 map.]

King, Maurice M.

310. Transfer Station Saves Santa Monica $60,000. *Refuse Removal Journal*, 5:11:10, November 1962.

Describes the unique refuse transfer station in Santa Monica, Calif. Increasing incineration costs, the smog problem, and the opening of the Mission Canyon sanitary landfill prompted the city to change its refuse disposal method from incineration to landfilling and to build the transfer station. Total initial cost of the transfer station and accessory equipment was $98,000, but disposal costs have been reduced from $4.10 to $2.40 per ton of refuse. Another advantage of the new system is that combined collection of refuse can now be made. [Gen. 2¾ pp. 4 ill.]

Michaels, Abraham

311. Incinerator-Ash Transfer Truck. *The American City*, 77:11:23, November 1962.

The city of Philadelphia, Pa., recently purchased 11 new closed, compaction trucks to haul residue from its incinerators to the disposal site. Advantages of the new trucks include: (1) a reduction in the weight of the loads; (2) a reduction of smoke in the ash tunnel due to the confinement of the truck opening under the ash gate; and (3) an end to the nuisance of open vehicles transporting wet and loose material over city streets. [News. ½ p. 1 ill.]

Muckelroy, Ed F.

312. Hauling Units Govern Design of Refuse Transfer Station. *The American City*, 77:6:98, June 1962.

Describes the refuse-hauling trailers and transfer stations used by the city of El Paso, Tex., for transporting refuse to the sanitary landfill site. After completing its landfill site near the Rio Grande, the city considered disposing of its waste by incineration and composting before it decided on using a distant sanitary landfill site and a transfer station system. Refuse trailers were first purchased after extensive tests, and the transfer stations were then designed for the trailers. [Det. 3 pp. 5 ill.]

H. DISPOSAL—General

Anonymous

313. Anaheim Achieves Transformation "From Dumpsite to City Park," *Western City*, 39:4:46, April 1963.

The city of Anaheim, Calif., has transformed a cavernous dump into one of its loveliest parks. The articles gives a brief history of the dumpsite before its conversion. The development crew survived many obstacles in planting turf and trees on top of the debris, in the installation of an automatic sprinkler system, and in covering sinking areas. A few portions of the dump are still sinking gradually, but the addition of more earth fill to firm the sandy loam should overcome the problem. [News. ½ p. 2 ill.]

314. Auto Manufacturers Report 400 Pounds of Refuse for Each New Unit Assembled on Line. *Refuse Removal Journal*, 6:9:12, September 1963.

Detroit automobile manufacturers have found that every car they assemble creates more than 400 pounds of refuse. This is true because many parts and accessories are shipped to the manufacturing plant in cardboard or wood containers. As each part is removed from its packing, large quantities of waste accumulate along the assembly lines. The article briefly tells how two leading automobile manufacturers solve the problem. [Gen. 2 pp. 6 ill.]

315. Bold Plans Needed for Refuse Disposal in London. *Public Cleansing*, 53:2:72, February 1963.

Discusses a bold plan for future disposal of refuse in London, England, using the areawide approach to the problem. Under the plan, the responsibility for refuse collection would remain with the borough councils, but disposal of all area refuse—domestic and trade refuse, and street sweepings—would be the responsibility of the Greater London Council. London refuse disposal is mainly a bulk transfer job—removing large quantities of refuse as quickly and as far away as possible from the place of origin, and it should be more economical to tackle such a task on a regional basis. There are three interlockinng factors which must be balanced in planning the future: the refuse must be brought by the collecting authorities to certain arranged points reasonably close to the borough boundaries; from there it must be transported to the disposal points by road, rail, or river; and at the disposal points, operations may be large-scale land reclamation, composting schemes, a series of smaller tipping sites, or a combination of these. [Gen. 3 pp.]

316. A British View of Disposal Problems. *Refuse Removal Journal*, 5:12:18, December 1962.

Discusses the three main methods of refuse disposal—sanitary landfilling, incineration, and composting. Landfilling is the cheapest method, but it it is governed by the availability of space. A salvage and pulverizing plant has recently been developed to consolidate the refuse, thereby increasing the life of the landfill. Incineration is an attractive method of refuse disposal in the large population areas. A Danish company has developed a very efficient incinerator which has a predrying moving grate and a rotating incineration kiln. Composting requires a careful preliminary study of raw materials and local conditions before installation. The design of a composting plant may be divided into two parts: the reception hopper, salvage recovery plant, and pulverizer; and the fermentation machinery. [Gen. 1⅓ pp.]

317. The Collectron—A New Dust Collector. *Public Cleansing*, 52:9:400, September 1962.

An entirely new dust collector has been developed recently which is producing a high degree of precipitation in a primary cyclone chamber. The air or gas flow leaving this chamber still carries a certain amount of the finer dust which is extracted by a sleeve into a high velocity recycling circuit. The dust is carried through the recycling fan and returned into the primary chamber where it is mixed with the incoming, heavily dust-laden gas, which further assists in precipitating the fine particles. The unit maintains a high collecting efficiency through the whole range of particle sizes even down to 2 microns. [Gen. 1 p. 1 ill.]

318. Connecticut Has Growing Disposal Woes. *Refuse Removal Journal*, 5:7:29, July 1962.

Refuse disposal is an increasing problem for Connecticut municipalities. Growing populations and higher sanitation standards are making the open-faced dump inadequate. Although the sanitary landfill is still the most satisfactory method of disposal for the least amount of money, limited available land precludes its use in many communities.

Some municipalities have been turning to incineration, which though probably the most efficient, sanitary, and nuisance-free method of disposal, is also the most costly. [News. ⅓ p.]

319. County Plans Disposal Needs to Year 2000. *Refuse Removal Journal*, 6:7:24, July 1963.

Orange County, Calif., has set up a continuing study of its refuse disposal system with the help of the U.S. Department of Health, Education, and Welfare and the Stanford Research Institute. A major point of the study is the plan to combine the refuse disposal system with flood control, soil erosion, air-pollution control, and regional park development. Orange County is to have five disposal sites and a scattering of transfer stations. The county plan has been projected to serve a population of 3 million until the year 2000. [News. ⅙ p.]

320. County Uses Dynamite on Dead Ocean Mammals. *Refuse Removal Journal*, 5:1:27, January 1962.

Health officials in Del Norte County, Calif., have found dynamiting to be the quickest, easiest, and most sanitary method of disposing of dead ocean mammals. Only when a carcass is in a location where dynamiting would be extremely hazardous is an alternative disposal method used—usually application of hot lime or chloride of lime to the carcass. The principal idea behind the dynamite method is to place the dynamite around the carcass in such a way that it is blown out to sea, where the resulting debris is cleaned up by tides and scavenger birds. For the actual blasting the county health department hires a powder expert, and costs are generally $10 or $15 per carcass depending upon the number to be disposed. [News. ½ p.]

321. Crusher Conserves Landfill Space. *The American City*, 77:12:14, December 1962.

To conserve a rapidly diminishing refuse-disposal area, a large eastern hospital has installed a continuous, heavy-duty crusher adjacent to one wall of its incinerator building. The unit which cuts space needed for the disposal of bottles and cans by 90 percent, consists of converging steel plates mounted on heavy roller chains and can crush over 5,000 No. 10 cans per hour. [News. ⅔ p. 2 ill.]

322. Disposing of Refuse at the Source. *Public Cleansing*, 52:5:222, May 1962.

Discusses, in general, the perpetual increase in the amount of refuse, the changing nature of refuse, and their impact upon disposal. Takes the position that efforts should first be made to dispose of refuse at the source, and if this proves to be inapplicable in certain instances, then other methods, such as collection and disposal, should be employed. Advocates the use of garbage grinders and domestic incinerator units for the reduction of refuse bulk at the source. Gives advantages and disadvantages of home incineration. [Gen. 4½ pp.]

323. How To Crush Waste Disposal Problems. *Safety Maintenance*, 124:6:59, December 1962.

This large Eastern hospital uses a separate incinerator and waste disposal building to dispose of its refuse. The building has two large loading doors to allow entry of collection trucks. Rubbish is dumped on the floor and pushed into incinerator openings. A special feature of the disposal plant is continuous converging steel plates mounted on heavy roller chains. It handles up to 7-gallon cans, and disposes of the common No. 10 can at a rate of over 5,000 per hour. [News. 1 p. 3 ill.]

324. Incineration v. Composting. *Public Cleansing*, 52:3:109, March 1962.

A brief discussion of advancements being made in the incineration and composting methods of municipal refuse disposal. Talks about efficient combustion, dust and fly ash arresting, residue removal, the need for effective demand for compost, and mechanical handling in fermentation. [Gen. 1½ pp.]

325. Industrial and Trade Refuse. *Public Cleansing*, 52:6:250, June 1962.

Extracts from a paper by Mr. L. Cundy, cleansing superintendent, St. Helens, England, which is concerned with the problem of disposal of industrial and trade refuse. Gives an idea of the magnitude of the problem, and suggests that many industries tipping their own waste do not make the best use of tipping space. Contends that to ensure maximum conservation of land, local authorities should manage the disposal of industrial and trade wastes, and that industries should pay for this service. Also includes discussion of the paper. [Ext. 3 pp.]

326. International Congress of Refuse Disposal Research Group *Public Cleansing*, 52:8:344, August 1962.

Extracts from two papers given at the Second Congress of the International Research Group on Refuse Disposal held from May 22 to May 25, 1963. The first, "Analysis and Evaluation of Solid Wastes With Regard to Composting" by Dr. P. Keller, discusses the cellulose content of garbage as a good criterion for the degree of putrefaction and for the degree of maturation of a compost. A table shows, by means of an example, how intense the disintegration of cellulose in garbage may be, in a periodically turned compost heap with good aeration and in a compost heap not turned and with poor aeration. The second paper, "The Factors Which Must Be Considered in the Planning of an Installation for Solid Waste Disposal" by Dr. R. Braun, emphasizes the variety of waste materials which must be disposed of today and the need for thorough studies of the particular conditions existing in the various municipalities for which waste disposal plants are to be built, and advocates a combination of composting and incineration for waste disposal in average-size municipalities or groups of municipalities. [Ext. 3 pp. 1 tab.]

327. Marketing Practices for Milorganite. *Compost Science*. 2:4:35, Winter 1962.

Outlines the marketing practices which enables the Milwaukee Sewerage Commission to sell its 70,000 tons of Milorganite (activated sewage sludge) for $3 million annually. Milorganite is available in all 50 States and in a few foreign countries. Large-volume consumers include golf courses, parks, cemeteries, schools, institutions, public buildings, and home owners. Distribution is accomplished through large distributors, wholesalers, and local retailers of lawn and garden supplies. A Turf Service Bureau and the Noer Foundation were organized to help the consumers of Milorganite solve turf problems. The Milorganite Spreader was introduced to also help the promotion of Milorganite. [Gen. 1 p. 1 ill.]

328. Modern Approach to Dust Problems. *Public Cleansing*, 53:2:86, February 1963.

A convenient method of dust collection at the refuse disposal plant which is now widely accepted as the modern approach to solving dust problems, is the employment of wet dedusters. This type of equipment has certain distinct advantages over other types of dust collection equipment: the wet deduster, by comparison with dry methods, takes up much less space and the dust, converted to sludge or slurry, is much more convenient to dispose of. The city of Edinburgh has firmly demonstrated its confidence in this method by installing wet dedusters in its Craigmillar plant. [News. 1½ pp. 1 ill.]

329. Modernization Plan. *Public Cleansing*, 53:1:32, January 1963.

The Birmingham Salvage Committee has given approval in principle to a proposal for rebuilding the refuse disposal and salvage works at Witton. The plant was originally built in 1924, and although certain extensions were made in 1938, they are now obsolete in design and unsatisfactory by modern standards. The disposal of light iron scrap is a special problem confronting the Birmingham Salvage Department. Accumulations of this type of scrap create difficulties by causing untidy conditions, restricting the movement of vehicles, and encouraging trespassers. A baling press which will be capable of dealing with all types of ferrous scrap that cannot be baled by the department's existing tin baling presses will soon be installed to eliminate the accumulations of loose scrap. [News. 1¼ pp.]

330. Naval Navvies. *Public Cleansing*, 53:6:276, June 1963.

Included in this general report on sanitation aboard a ship is a brief discussion of the methods used for solid wastes disposal. [Gen. 4 pp.]

331. New System for Disposal of Classified Documents. *Refuse Removal Journal*, 5:10:14, October 1962

A Los Angeles, Calif., disposal firm is doing some successful pioneering in the disposal of classified government documents. In the past, government regulations on the disposal of such material have forced defense plants to install their own pulping or furnace facilities for this purpose. The Los Angeles disposal firm has recently developed mobile disintegrator equipment which may replace the individual furnaces and provide substantial savings to defense companies and the government in the future. The equipment is able to disintegrate material at a rate of 3,000 pounds per hour without burning. [Gen. 2⅓ pp. 3 ill.]

332. Northeast Winds of Change. *Public Cleansing*, 52:11:502, November 1962.

Discusses sanitation activities in Sunderland, England. Two pictures taken 8 years apart graphically illustrate the infilling which has taken place in the Sunderland landfill during this period. The landfill appears to be nearing the end of its useful life, and new methods of refuse disposal will have to be explored by city officials. Presents labor costs per ton for the baling of wastepaper in Sunderland for the years 1951–52, 1954–55, 1957–58, and 1961–62. Increased mechanization in this operation has substantially reduced the labor costs. Also gives transport cost data. Even though wages, license charges, and depreciation have increased, operating and maintenance costs have been reduced. Fuel consumption has been greatly reduced as the figures indicate. [Gen. 3½ pp. 2 ill. 2 tab.]

333. Open Bids on City Disposal Facilities. *Refuse Removal Journal*, 6:11:34, November 1963.

The city of St. Peterburg, Fla., will shortly call for bids for a private contractor to design, finance, construct, and operate a solid waste disposal facility under a 20-year contract with the city. The specifications have been prepared to allow responsible bidders to offer any proven process which will dispose of the city's collected refuse. Three disposal plants will eventually be needed. The city will pay a contract amount per ton of refuse delivered to the disposal site. [News. ¼ p.]

334. Packaged Refuse Disposal Plants. *Public Cleansing*, 53:10:476, October 1963.

Briefly discusses the standard-unit refuse disposal plants which have been produced by a British manufacturer. The idea of producing standardized plants has not been thought to be a workable concept because of the many variables which occur in both the nature of refuse and the requirements of areas; but in this instance, it seems that the vast majority of the major variables has been taken into consideration. Basically the designs cover a range of 12 standard-unit plants for refuse transfer, incineration, and composting, each of the processes being preceded by separation, salvaging, and pulverizing, and all-embracing automatic control features. The principle has been to provide for low capital and running costs, the minimum utilization of site space, the reduction of maintenance requirements, and for convenient extension or modification. The standard plants comprise four sizes, handling 50, 100, 200, and 300 tons of refuse per day. [Gen. 2½ pp. 1 ill.]

335. PHILADELPHIA HAS PLAN TO SOLVE DISPOSAL WOE. *Refuse Removal Journal*, 5:11:17, November 1962.

The Streets Department of Philadelphia, Pa., is hoping to solve its refuse disposal problems by reclaiming miles of river-front land presently underwater. The reclaimed land would be used for recreation and industrial development. Ashes from the city incinerators and noncombustibles will be deposited in the fill. [News. ½ p.]

336. REFUSE DISPOSAL—BREAKTHROUGH IN TECHNICAL DEVELOPMENT IS URGENTLY NEEDED. *Public Cleansing*, 52:3:105, March 1962.

Briefly discusses the refuse disposal problem today and some of the disposal methods being used—the combination chute and turntable system, garbage grinders, the communal waterborne system, and onsite incinerators and calciners. [Gen. 2½ pp.]

337. REFUSE DISPOSAL IN DUMFRIESSHIRE. *Public Cleansing*, 53:5:241, May 1963.

Presents a paper, entitled "Developments in Refuse Disposal in Dumfriesshire," by John W. Fletcher. The paper discusses the new refuse disposal scheme inaugurated in Dumfries County, in which the towns of Langholm, Lochmaben, Scotland, and Lockerbie are participating. Describes: (1) the separation-composting plant, which will process both refuse and sludge; (2) allocation of costs of the scheme; (3) population distribution and refuse quantity in the area; (4) the selected site for the disposal works; and (5) transfer provisions at locations around the county for bulk transport of refuse and sludge to the disposal works, including locations of the six transfer depots, containers and vehicles used in the system and operation of the (Penman) transfer system. An appendix gives estimated capital outlay and annual costs. A discussion follows the paper. [Det. 12½ pp. 3 ill. 2 tab.]

338. REFUSE DISPOSAL ON CREDIT. *Public Cleansing*, 53:11:579, November 1963.

Describes a new system of refuse disposal in which composting plants are erected, owned, and operated by private companies to whom local authorities pay an agreed price per ton of municipal refuse delivered to the disposal plant. The local authority provides the company with information about quantity of material handled per day, its population, and its existing refuse disposal costs. The firm then calculates the quantity of compost likely to result, assesses its market value, and prepares an estimate of the price to be paid for refuse disposal by the local authority. Also describes the composting method the company might use to process the municipal refuse. [Gen. 1½ pp.]

339. REFUSE UP, FACILITIES DOWN. *The American City*, 78:11:33, November 1963.

Chicago's six-county metropolitan area faces the task of disposing of ever-increasing amounts of refuse in an area where other land-use demands are also increasing. A report by the Northeastern Illinois Metropolitan Area Planning Commission recommends that municipalities in this area convert open dumps into sanitary landfills, use incinerators to conserve disposal sites, convince the public that well operated disposal areas do not hurt surrounding property, and make long-range plans for areawide refuse disposal. [News. ⅓ p.]

340. SHIPS TRASH PROBLEM IN GREAT LAKES PORTS. *Refuse Removal Journal*, 6:12:30, December 1963.

A recent survey by the U.S. Department of Agriculture revealed that 170 vessels generate 1,000 to 2,000 tons of garbage yearly while in the Great Lakes, and that only a limited number of Great Lakes cities have facilities approved for the disposal of ships waste. Incineration is about the only practical way to deal with the refuse. Such facilities should be required in every port development program unless a suitable alternative provision has been made for its acceptance, handling, and disposal. [News. 1/6 p.]

341. SWISS SOLUTION TO REFUSE AND SLUDGE DISPOSAL. *Public Cleansing*, 53:6:290, June 1963.

Briefly describes the new combination composting and incineration plant in Buchs, Switzerland. The plant contains a refuse grinding unit with sludge addition on the Buhler system and a refuse incinerator. It disposes of the refuse from 40,000 inhabitants in the area and liquid sludge from an adjoining sewage works serving a population of 11,000. [Gen. 2 pp.]

342. TOWN RESCUES CITIZEN FROM RANDOM DUMPING. *Refuse Removal Journal*, 6:6:19, June 1963.

An irate citizen and his neighbors in Roseville, Minn., got their town council to move against wanton use of the citizen's property as a dump. The action the council took was to adopt regulations requiring a license for putting fill on any property, the control of dust, and regular coverings of dirt over any fill permitted, limiting the total amount of fill in any one place, and banning an unreasonable amount of organic material. The town also erected signs on the citizen's property warning trash disposers of the new regulations. [News. ¼ p.]

343. VANISHING LANDFILL SITES WORRY MOST CANADIAN HAULERS. *Refuse Removal Journal*, 6:11:10, November 1963.

Describes the refuse disposal problem which confronts Canadian cities today. Although it is not as severe as in many areas in the United States, the problem is a formidable one, nonetheless. The most favorable disposal method is the sanitary landfill, but as present sites are filled and as population increases, acceptable disposal sites are being established further and further from the urban centers, and consequently the cost of hauling the refuse is increasing. Discusses briefly the disposal situations in Toronto, Vancouver, Montreal, Ottawa, Winnipeg, Calgary, and Saskatoon. One of the major factors behind Canada's refuse disposal problem is the lack of concern for the problem and the lack of acceptance of the sanitary landfill on the part of the public. [Gen. 2⅓ pp. 3 ill.]

344. Walbrook Wharf. *Public Cleansing*, 53:3:115, March 1963.

A detailed description of refuse disposal in the city of London, England. First, briefly discusses the various refuse disposal alternatives open to the city. After weighing all evidence, officials adopted river transport and controlled tipping as the most appropriate disposal method for the city. Then describes: (1) the site of the Walbrook Wharf, where the refuse is transferred from collection trucks to barges; (2) the final disposal site, a 209-acre tract of land at Stanford-le-Hope; (3) the capacity of the Walbrook Wharf Depot, including barge accommodations; and (4) services and facilities provided at the depot—the tipping facility, facilities for vehicles, the salt and sand store, the general stores, personnel facilities, administrative accommodations and domestic accommodations. [Det. 8⅔ pp. 2 ill.]

345. What Kind of Plant—And at What Price. *Public Cleansing*, 52:1:21, January 1962.

A brief discussion of when to consider the construction of a disposal plant as opposed to land disposal of refuse, what kind of plant to build, and at what price. There is no need to construct an incinerator plant if there is land available for disposal, but it should be remembered that use of an incinerator will extend the useful life of the refuse tip by four- or five-fold. Local conditions may dictate the type of disposal plant adopted. In the last 10 years many refuse-treatment plants have been built throughout the world at varying costs ranging from £1,000 to £5,000 per ton per 8-hour day. [Gen. 1⅓ pp.]

Baker, James S.

346. Finding the Lowest Cost for Refuse Disposal. *Public Works*, 94:11:84, November 1963.

The problem of designing the most economical refuse disposal program for a heavily urbanized area has become exceedingly intricate and complex in recent years as new transport and disposal methods have been developed. The primary weakness in minimizing refuse disposal costs using traditional methods stems from an inability to give adequate consideration to all possible alternatives while completing the analysis within a reasonable period of time. Through the use of electronic digital computers with the "free choice" approach and trial and error procedure, the work involved can be greatly reduced while still considering all possible factors and alternatives. The article illustrates this idea by applying electronic data processing to determine the best possible areawide refuse disposal system for a hypothetical urbanized county containing a core city, four satellite cities, and a sanitary district. (Details are not given.) The pilot program was executed on the University of Maryland's IBM 7090 data processing system. Execution time was approximately 35 seconds, equivalent to at least 6 months of calculating time for one man using a desk calculator. Also gives a basic outline of the information required for solution, normally referred to as input data, and of the instructions concerning the use of the data. [Gen. 3 pp. 1 map.]

Baskous, A. A.

347. Disposal Comments: Dumps Versus Fills. *Refuse Removal Journal*, 5:5:24, May 1962.

Discusses three topics: the open dump as a method of refuse disposal in New York State; the sanitary landfill; and what the State health department can do to assist in solving some of the problems caused by unsatisfactory refuse disposal. Out of 550 incorporated villages, 932 towns, and 62 cities in the State, only 54 communities have refuse disposal incinerators and only 31 operate sanitary landfills, indicating that a large proportion of the communities deposit refuse in open dumps. Many of these dumps create nuisance problems; over 150 such dumps serving 3 million people are known to exist in the State. The article lists seven essential principles on which a sanitary landfill should be operated, and cites several advantages of the landfill—reclamation of wasteland, mobility, ease of obtaining new sites, eliminating nuisances, and possibility of reducing the haul distance. Cost of disposal by landfill is about $1 per ton where the haul is less than 10 miles, but if it exceeds 10 miles disposal by incineration should be considered. Also gives a summary of results from a survey by the American Society of Civil Engineers of the operation of over 250 landfills. State health departments should develop minimum standards for refuse disposal to prevent the occurence of public health nuisances. [Det. 3 pp. 1 ill.]

Black, Ralph J.

348. Combine Disposal of Sewage Sludge and Refuse To Save Money, Engineer Suggests. *Canadian Municipal Utilities*, 100:4:36, April 1962.

Reprint. (See items No. 349 and No. 350.) [Gen. 1½ pp.]

349. Combined Disposal of Sewage Sludge and Refuse. *Compost Science*, 2:4:16, Winter 1962.

Reprinted from a report which appeared in the *Proceedings of the Third Pittsburgh Sanitary Engineering Conference on Municipal Solid Waste Disposal*, November 4, 1961. (See item No. 235 in the supplement E bibliography.) Contends that the combined disposal of sewage sludge and refuse is an example of a possible change in the practice of solid waste disposal which has received little serious attention. Discusses the combined disposal of sewage sludge and refuse by sanitary landfilling, incineration, and composting, and gives reports from a few cities that have combined these operations. In combined disposal by landfilling, separate trenches may be excavated for septic tank sludge or the sludge may be spread on top of a layer of compacted refuse. In New York digested sewage sludge is used to make artificial topsoil over completed sanitary landfills. Sewage solids are buried along with the refuse at some landfills. Refuse incineration produces excess heat which can be used to dry or incinerate sewage solids. However, combined disposal by incineration can only be used where the incinerator and sewage treatment plants are located within a reasonable distance from each other. A number of European composting plants are successfully utilizing raw or digested sewage sludge, and research indicates that this practice could also be successful under conditions in the United States. (See items No. 348 and No. 350.) [Gen. 2 pp. 13 ref.]

Black, Ralph J.

350. Municipal Solid-Waste Disposal—Part VII. *The American City*, 77:8:139, August 1962.

Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961. (See items No. 348 and No. 349.) [Det. 1⅔ pp. 13 ref.]

351. A Review of Refuse Disposal Practices. *Refuse Removal Journal*, 6:10:16, October 1963.

Discusses briefly: the cost of refuse collection and disposal in the United States today; a few studies being conducted into refuse disposal on a regional basis; recent composting developments in this country; incineration; landfilling differentiating between the sanitary landfill, the refuse fill, the controlled burning dump, and the open dump; and six questions concerning the firing of dumps, contending with residents living adjacent to the landfill, preventing deterioration of the landfill, burning methods to reduce smoke and odors, availability of cover material, and salvaging at disposal areas. [Gen. 2½ pp. 4 ill.]

Braun, R.

352. Planning Treatment Plants for Domestic Wastes. *Compost Science*, 3:2:24, Summer 1962.

Discusses preliminary work which should be carried out before setting up plans for a waste disposal plant. This includes: (1) regional planning and outline of the area; (2) definition of the amounts and types of waste to be disposed of—domestic garbage, bulky waste and garden waste, street and market garbage, sewage sludge, and industrial waste—and interpretation of data obtained; (3) selection of methods of transformation; and (4) selection of the site for the plant. [Gen. 2 pp. 1 ill.]

Burnett, Carey C.

353. From City Dump to Industrial Park. *The American City*, 78:7:95, July 1963.

The city of Columbia, S. C., Richland County, and the Greater Columbia Chamber's Industrial Development Commission recently combined efforts to convert a 400-acre abandoned city refuse dump into an eye-appealing industrial park. The park is a tract of graded land located on a wide, paved, and landscaped boulevard, containing curbs, gutters and storm drains, water and sewer mains, gas, electric, and telephone lines and access to railroad sidings. The land can be sold to industries at a price sufficient to recover improvement costs and to provide enough margin to purchase and develop future sites. In addition, the new industry will provide additional jobs for local citizens and bring in substantial revenue through property and inventory tax payments. [Gen. 1½ pp. 2 ill. 1 tab.]

Davies, A. G.

354. Refuse Disposal—Problem and Task of Our Time. *The Sanitarian*, 71:7:349, April 1963.

A general and thorough discussion of refuse disposal, including the following: the general problem; the task on hand; alleviation of the problem at the source—sink waste grinding, home incineration; power compression to aid bulk transport; ultimate disposal—salvage recovery, land reclamation, incineration, waste heat conservation, refuse pulverizing, composting; and the task and problem of the future. [Gen. 10½ pp. 2 ill. 2 diag.]

355. Waste Disposal—Task and Problem of Our Time. *Compost Science*, 3:2:5, Summer 1962.

Discusses the problem of waste disposal in a general context. Includes: magnitude of the problem; the need for a cooperative effort if reuse of wastes is to be accomplished; refuse pulverizing—the Volund pulverizer, and the French Gondard pulverizer; the composting of waste materials; and the task and problem of the future. [Gen. 2 pp.]

Dobson, Ann L.; and Wilson, H. A.

356. Refuse Decomposition in Strip-Mine Spoils. *Proceedings of the West Virginia Academy of Science*, 1963. p. 59.

Reports on experiments conducted to study the various aspects of microbial decomposition of household refuse when incorporated with vegetated and nonvegetated strip-mine spoil. Spoil samples were taken from two strip-mine areas, one in West Virginia near Cheat Lake and the other near the West Virginia-Pennsylvania State line. Household refuse used in the study was collected from home garbage cans, sorted, and ground in a hammermill to obtain as uniform a sample as possible. Oxygen uptake was used as an indicator of microbial activity or decomposition. To learn something of the microbial numbers at high temperatures in the decomposition process, a sample of household refuse was mixed with the strip-mine spoil and incubated at 55° C. for 3 months. To study decomposition at different moisture levels, refuse was adjusted to moisture levels of 32, 55, 77 and 86 percent, and incubated at 30° C. Refuse alone showed an overall gradual increase in oxygen uptake each day, but was considerably less that that of refuse mixed with the spoil. Another experiment was conducted comparing oxygen uptake rates of nonvegetated spoil-, and andropogan spoil-refuse mixtures with uptake rates of mixtures using organic chemicals instead of household refuse. [Det. 6½ pp. 5 gr. 2 tab. 5 ref.]

Dove, Lloyd A.

357. Municipal Solid-Waste Disposal—Part X. *The American City*, 77:11:112, November 1962.

Discusses the areawide approach to refuse disposal. Includes: (1) the effects of refuse disposal on public health—breeding vectors of human disease and creating water and air pollution; (2) the the effects of refuse disposal on street and highway systems; (3) legislative acts and policy measures a regional body should consider with regard to areawide refuse disposal; (4) field and office studies and surveys to review the overall problem and reorganize disposal methods in a more logical manner; and (5) regulating and financing areawide refuse disposal. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Gen. 2½ pp. 2 ill.]

Egbert, Donald C.

358. 14 Michigan Cities Form Cooperative for Trash Disposal. *Refuse Removal Journal*, 6:11:16, November 1963.

Reprint. (See item No. 359.) [Gen. 2½ pp. 3 ill.]

359. Unified Refuse Disposal Operations. *1963 American Public Works Association Yearbook*, p. 324.

Gives a brief summary of the organization, financing, and operation of the Southeastern Oakland County Incinerator Authority, an Authority created by 14 municipalities of South Oakland County, Mich. The Authority, presently serving a population of 350,000, disposes of 112,000 tons of refuse annually by incineration and sanitary landfilling. Tells of the Authority's experiences in establishing a unified refuse disposal operation. (See item No. 358.) [Gen. 2½ pp.]

Feldstein, M.; Duckworth, S.; Wohlers, H. C.; and Linsky, B.

360. The Contribution of the Open Burning of Land Clearing Debris to Air Pollution. *Journal of the Air Pollution Control Association*, 13:11:542, November 1963.

Examines the contribution of the open burning of land clearing debris to air pollution, and compares this with the contributions of other air pollution sources. Describes the general localized effects, the general areawide effects, the quantities of pollutants produced from open burning, and the contribution to localized effects by open burning (smoke and visibility reduction, eye irritation, carbon monoxide produced, vegetation damage, and fallout). Presents data comparing emissions from gasoline engine operations, backyard and single chamber incineration, and multiple chamber incineration, and estimating tonnages of gases and particulates emitted by open burning of land clearing debris. [Det. 3½ pp. 3 tab. 15 ref.]

Foster, William S.

361. Municipal Solid-Waste Disposal—Part I. *The American City*, 77:2:105, February 1962.

Discusses the nature and magnitude of the municipal solid-waste disposal problem today. Emphasizes "human nature" as an important factor to consider in attempting to solve the problem. Talks about refuse quantities, the incinerator trend, vector problems caused by the open dumping of garbage, and the use of home garbage grinders. Lists eight problems which must be solved in order to meet future refuse disposal needs. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Gen. 3 pp. 1 ill. 4 ref.]

Frank, Maurice

362. Liquid Manure System. *Compost Science*, 2:4:36, Winter 1962.

The new automatic, liquid-manure systems include three basic components: (1) mechanical, motor-driven sweepers or cleaners which gather and deposit the manure; (2) the converter tank where the manure is mixed with water and decomposed by bacterial action; and (3) a distribution system of pipes for crop irrigation out in the field. Farmers can make better use of the manure in this way. Describes an operation at the James High poultry farm near New Holland, Pa. The cost completely installed was $7,000 to serve 20,000 birds. [Gen. 2 pp. 3 ill.]

Giger, Robert

363. The Refuse Utilization Plant of the Werdenberg-Liechtenstein Region in Buchs (St. Gallen). *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 15. December 1962.

Discusses events which led to the establishment of an areawide refuse disposal scheme in the cities and villages of the principality of Liechtenstein and the district of Werdenberg, Switzerland, and decribes the refuse utilization plant constructed in Buchs to dispose of refuse from these areas. The installation consists of a refuse grinding plant combined with a sludge mixer using the Bühler system, and a refuse incinerator and carcass crematorium. [Det. 4 pp. 1 diag.]

Grindrod, J.

364. British Farm Sets Up Organic Irrigation Program. *Compost Science*, 3:1:20, Spring 1962.

Liquid manure disposal system using slatted floors is found to be economical on 750-acre farm at Westertown, Rothienorman, Aberdeen, Scotland. The manure is washed through the slats and into a cess pit where it is sprayed on the fields. There has been a savings in straw costs and also labor costs. The costs range from $4.20 to $7 per cow per year for a herd of 80 cows or more. The cost of fuel and extra water is about $2.80 per cow per annum. [Det. 2 pp. 4 ill.]

Hall, Ernst P.

365. Air Pollution From Coal Refuse Piles. *Mining Congress Journal*, 48:12:37, December 1962.

The problem of air pollution caused by burning coal refuse piles, is considered to be serious by several local and state air pollution control agencies and the U.S. Public Health Service. This article discusses the problem and disposal methods which should be used to eliminate air pollution. Includes: extent and nature of the problem; legal background of air pollution from coal refuse piles; the problem's effect on public relations and the image of the coal industry; spontaneous ignition of the coal refuse pile; considerations of importance in engineering a coal refuse pile so that it will not produce air pollution--selection and preparation of refuse site, geometry of refuse piles, disposal practices, refuse-particle size, and pile maintenance; techniques for controlling or extinguishing coal refuse fires—sealing the pile with a fine blanket of impervious material, grouting or filling the void spaces in the refuse, and cooling and repiling the refuse; and operational costs of coal refuse disposal and refuse fire control. [Det. 5 pp. 4 ill.]

Issac, P. C. G.

366. Treatment of Sewage as an Aid to Economical Disposal. *Compost Science*, 3:1:7, Spring 1962.

Discusses many uses of liquid and solid sewage wastes. These include: (1) reuse of water, and the use of sewage effluents by industries; (2) spray disposal of cannery wastes; (3) irrigation in semiarid regions with sewage effluents; (4) use of algal oxidation ponds; (5) use of sewage sludge; and (6) sludge-refuse compost. Although disposal of sewage may not be a profit to a community, there are a number of ways in which the cost can be reduced by the utilization of sewage products. [Det. 4½ pp. 3 ill. 17 ref.]

Jaag, O.

367. International Research Group on Refuse Disposal. *Compost Science*, 3:1:4, Spring 1962.

A report by the president of the International Research Group on Refuse Disposal describing the founding, duties, and organization of the group. The group is a voluntary organization interested in methods of treatment and utilization of solid, domestic and industrial wastes on the basis of community utility. Duties of the secretariat include: coordination of the work done by institutes and laboratories throughout the world on waste disposal problems; standardization of methods of analysis; publication of an information bulletin three times yearly giving information about progress made in waste disposal; organization of an international congress every 2 or 3 years; organization of meetings among authorities to discuss special problems; and acting as an information center on waste disposal problems. The article also includes a summary of the schedule for the Second International Congress, May 22–26, 1962, at Essen, Germany, and the Constitution of the IRGR (Articles: I. Name; II. Objectives; III. Membership; IV. Executive Committee; V. Financial contributions; and VI. Constitutional amendments and dissolution of the International Research Group). [Det. 2½ pp.]

Lane, J. M.

368. Municipal Solid-Waste Disposal—Part VIII. *The American City*, 77:9:205, September 1962.

An overall engineering evaluation of municipal solid wastes disposal. Includes: (1) a brief history of solid waste disposal; (2) definition of terms—wastes, refuse, sewage, garbage, rubbish, combustible rubbish, and sewage solids; (3) quantity and composition of refuse; (4) open dumping; (5) hog feeding; (6) combined disposal of garbage and sewage solids; and (7) sanitary landfilling. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) (Continued in item No. 369.) [Gen. 3 pp. 1 ill. 7 ref.]

369. Municipal Solid-Waste Disposal—Part IX. *The American City*, 77:10:137, October 1962.

A continuation of an overall engineering evaluation of municipal solid-waste disposal (see item No. 368), discussing incineration and composting. Includes: (1) prerequisities for the successful destruction of refuse by incineration—a source of heat, supply of air, sufficient furnace, combustion chamber, and flue volumes, inimate mixing of products of combustion and air, and agitation of the materials; (2) reasons why composting has not been successful in the Uniited States up to the present time; (3) incineration of sewage sludge solids. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Gen. 2⅓ pp. 1 ill. 5 ref.]

Lewis, Rudolph P.; McKee, Samuel B.; Bell, Frank A., Jr.; and, Carter, Horace S.

370. *Air Pollution in Georgia.* A Cooperative Statewide Survey. Atlanta: State of Georgia, Department of Public Health. April 1962. 35 pp.

In this study, it was found that burning refuse dumps, the burning of automobile bodies, and the burning of wood waste are all major sources of air pollution in Georgia. Nineteen out of 23 district health departments responding and 21 out of 80 cities responding indicated burning refuse dumps as a source of air pollution. This is the second most common and extensive air pollution problem in Georgia. Over 2,000 sawmills, planing mills, and furniture factories create about 5 million tons of wood waste annually, most of which is disposed of by burning. Burning of wood waste frequently produces smoke and cinders which cause local air pollution nuisances. Particularly annoying are the smoke and fumes arising from the open burning of old automobile bodies for salvage purposes. The various municipalities and other responsible agencies should take steps to eliminate burning refuse dumps and to provide better means of refuse disposal such as the sanitary landfill or properly designed incinerators. Means for use or disposal of wood waste which do not create air pollution problems are available and, in some cases, are economically advantageous. Auto burners with air pollution controls are available and one has been built and placed into operation in Georgia. [Gen. 35 pp. 4 ill.]

McKinney, Ross E.

371. "Refuse Disposal" (Chapter 24). *Microbiology for Sanitary Engineers.* New York: McGraw-Hill, Inc., 1962. 293 pp.

Devotes a short chapter to the two types of refuse disposal by microorganisms—sanitary landfilling and composting. Discusses briefly decomposition of organic matter in the sanitary landfill method of disposal. Under composting, discusses: two types of composting—the open-windrow system and the the mechanical system; microorganisms in the compost process; temperature; moisture; hydrogen-ion concentration; nutrients; air; particle size; materials composted; compost analysis; and the future of composting. Also contains a chapter on radioactivity, which includes a section on nuclear waste disposal—decay, waste treatment, tolerance levels, and sources of wastes. [Det. 10 pp. 1 gr.]

Mortenson, Earl W.

372. Description of a Two-Compartment Trench System of Refuse Disposal. *California Vector Views,* 9:4:21, April 1962.

Under conditions where a sanitary landfill is not practical, only small amounts of refuse (mostly rubbish) are received, and burning is not objectionable; an alternative method of refuse disposal is the two-compartment trench system. A trench (300 to 400 feet long, 4 to 8 feet deep, and 15 to 20 feet wide) is constructed and divided into a receiving pit and a storage section. All the refuse is placed in the receiving pit and burned routinely. A bulldozer pushes the remaining refuse into the storage section where it is compacted in successive 2-foot layers. After the refuse is compacted, it is covered with about 1 foot of compacted soil. The receiving pit can be used repeatedly, and as each storage section is filled additional storage sections can be constructed parallel, perpendicular, or radiating from the receiving pit, depending upon the terrain and soil characteristics. [Gen. ½ p.]

Muir, Joe

373. Manure Pays Off for California Rancher. *Compost Science,* 2:4:28, Winter 1962. Originally appeared in *The Farm Quarterly.*

Describes the manure disposal operations of a Collinsville, Calif., rancher. Includes the gathering, composting, bagging, and marketing of the feedlot manure. The fresh manure accumulated during the year is first scraped off into piles for loading. The manure is loaded either into manure spreaders to be taken out onto the range and pasturelands or into dump trucks to be hauled to the fertilizer plant. At the plant a huge manure pile is built for composting purposes. The composted manure is pulverized, coarse pieces remaining are separated by a vibrating screen, and the resulting material is sent to the bagging station. Most of the bagged manure is sold to two distributors, while the remainder is sold by the ranch directly to local residents and establishments. The ranch sells 8,500 to 9,000 tons of manure annually, bringing a gross income of $27,000. [Det. 3 pp. 1 ill.]

Rockey, John W.

374. "Refuse Disposal" (p. 23). *Farmstead Sewage and Refuse Disposal.* Agriculture Information Bulletin No. 274. Washington, D.C.: U.S. Government Printing Office. 25 pp.

Discusses very briefly the sanitary disposal of refuse on the farmstead. Includes: definitions of refuse, garbage, and rubbish; proper storage of refuse; food waste disposers; the feeding of garbage to animals; incineration; ground burial of refuse; and composting. Each of these subjects is discussed in one or two short paragraphs, and few details are given. Drawings illustrate suitable racks for refuse containers and a satisfactory incinerator for farmstead use. [Gen. 1½ pp. 2 ill.]

Rogus, Casimir A.

375. Refuse Collection and Disposal in Western Europe—Part III. *Public Works,* 93:6:139, June 1962.

Describes some of the refuse disposal systems employed in Western Europe. Includes reclamation (salvaging), admixing to soils (direct use in agriculture), controlled tipping (sanitary landfilling), and composting. European refuse disposal practices usually are not limited to a single operation like those in America. Collected refuse is first brought to a central depot where salvageable materials are sorted out, the remaining refuse then being either incinerated, composted, or deposited at a sanitary landfill. Tables give major disposal methods used (in percentages), materials salvaged in England, and operation and use of sanitary landfills. Three conclusions are reached: (1) European trend seems to be away from salvaging; (2) disposal by sanitary landfilling is the dominant method used in Europe; and (3) composting continues to be recognized as an advantageous refuse disposal method. (See items No. 284 for part I, No. 285 for part II, and No. 645 for part IV.) [Det. 5 pp. 5 ill. 3 tab.]

Sheaffer, John R.; and Hackett, James E.

376. Refuse Disposal Needs and Practices in a Metropolitan Area. *The APWA Reporter*, 30:10:8, October 1963.

The Northeastern Illinois Metropolitan Area Planning Commission has recently undertaken to evaluate the current refuse disposal situation, to estimate future needs for disposal sites over the next two decades, and to develop policies for the guidance of local governments in planning and carrying out refuse disposal programs. This article briefly describes: the research methodology used in the study; some of the environmental problems associated with refuse disposal—protection of water quality, land reclamation, and flood control and drainage; space requirements; and recommended metropolitan refuse disposal policies. [Gen. 2¼ pp. 1 map.]

Sheaffer, John R.; von Boehm, Berndt; and Hackett, James E.

377. Refuse Disposal Needs and Practices in Northeastern Illinois With Refuse Disposal Policies for Northeastern Illinois. Technical Report No. 3. Chicago: Northeastern Illinois Metropolitan Area Planning Commission, June 1963. 72 pp.

Consists of two parts: a technical report on present refuse disposal practices and facilities and future refuse disposal needs in Northeastern Illinois, preceded by an official statement of policy on refuse disposal planning which was adopted by the Northeastern Illinois Planning Commission on April 18, 1963. Includes chapters on: refuse disposal—a metropolitan problem; status of refuse disposal, 1960; methods of refuse disposal; multipurpose concepts in refuse disposal; refuse disposal and ground-water pollution; the relation of refuse disposal to urban society; space needs for refuse disposal; and a metropolitan approach to refuse disposal. All of these topics are discussed in relation to the Northeastern Illinois refuse situation. Appendices give present disposal space requirements, life of existing sites, other statistics on refuse disposal sites and incinerators, and ownership and remaining capacity of refuse disposal sites by counties in Northeastern Illinois. [Det. 72 pp. 5 ill. 6 diag. 7 maps. 32 gr. 7 tab.]

Shults, F.

378. Some Thoughts on the Future of Refuse Disposal in Great Britain. *Public Cleansing*, 53:7:335, July 1963.

A look into the future of refuse disposal in Great Britian, covering the following items: (1) the decline of controlled tipping as an effective means of refuse disposal, due to the ever-increasing volume of refuse and distance to disposal sites; (2) the questionable future of bulk transport of refuse to disposal sites; (3) a comparison of costs of disposal by controlled tipping and by incineration and separation-incineration from 1935 to 1938 and from 1952 to 1961; and (4) the use of the chain or reciprocating grate for more efficient incineration of municipal waste, including descriptions of the Volund incinerator plant in Gentofte, a suburb of Copenhagen, Denmark, and the twin-furnace plant in Sundbyberg, a suburb of Stockholm, Sweden. The author favors incineration as the most prevalent refuse disposal method in the future. [Det. 9½ pp. 2 ill. 1 tab. 1 gr.]

Straub, H.

379. Practical Conclusions From Scientific Research. *International Research Group on Refuse Disposal Information Bulletin No. 14*, p. 1. April 1962.

A lengthy and detailed discussion of the combined disposal of refuse and sewage sludge. Because extensive analysis has shown that these wastes supplement each other to a large extent, those procedures which involve common, simultaneous processing of refuse and sewage sludge deserve particular attention. Joint refuse-sludge processing can only be contemplated when equivalent amounts per capita can be treated. Quantities (volume and weight) of sewage solid matter yielded per capita per year by various treatment processes and the amounts remaining after sludge digestion, and quantities (volume and weight) of domestic refuse yielded per capita per year are examined and compared. The relative proportions between weight and volume must be considered if equivalent quantities of sewage sludge and refuse are to be treated or disposed of. Preliminary investigations must be made to determine what these equivalent quantities are in order to compute the proportions of solid matter and the volumes requiring treatment. Moisture content, quantities, and colorific value of the refuse and sludge must be known in planning disposal facilities. The essential requirement of any refuse-sludge disposal method is that it satisfy sanitary standards. Emphasis is placed upon the combined disposal of refuse and sewage sludge by composting. [Det. 15 pp. 1 tab. 2 gr. 7 ref.]

Vogel, H. E.

380. The Refuse Problem of Swiss Resort Towns. *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 1. December 1962.

Reviews the refuse problem in Swiss resort towns today. Gives reasons why refuse removal in resort towns presents a problem which differs sharply from that in other communities. An investigation was conducted to determine the refuse situation in the Swiss resort towns. In order to obtain a representative average of the tourist towns, a tourist intensity coefficient was calculated, and 36 towns were included in the investigation. The article summarizes the results of the study. The refuse situation was found to be very bad in most tourist centers; refuse is disposed of in ways which create unpleasant odors and health hazards. The ever-increasing construction of new tourist lodgings, urbanization, and tourists bringing different customs and consumption habits to the Swiss resorts intensify the refuse problem. [Gen. 4 pp.]

Wagner, Carl

381. An Economist Looks at the Problem of Refuse Disposal. *Public Cleansing*, 53:8:387, August 1963.

Summarizes a report on the problem of refuse disposal by an economist resulting from work done during his recent sabbatical year. Presents his observations and reflections of the present day refuse disposal situation. Reflects very generally upon: factors creating the refuse disposal problem; the range of disposal methods; the sorting, handling, and salvaging of refuse; the lumping together of costs of the different stages of refuse handling; the various refuse appliances and plants in operation; composting and the agricultural utilization of municipal refuse; and two refuse disposal installations which were particularly appealing—the Dano Biostabilizer and the Gondard Refuse Reducer. [Gen. 4 pp.]

Welsh, Gene B.

382. *Air Pollution in the National Capital Area.* Public Health Service Publication No. 955. Washington, D.C.: U.S. Government Printing Office, July 1962. 42 pp.

This study reveals that waste disposal operations such as incinerators, backyard burning, open burning dumps, and the burning of leaves and wastes of construction and demolition are a significant contribution to the total air pollution problem in the Washington metropolitan area. A section is devoted to refuse disposal operations, leaf removal, and the disposal of construction and demolition wastes in the District of Columbia and in nearby Virginia and Maryland, and their effects upon air pollution. A table summarizes the refuse disposal practices in the Washington metropolitan area, and an appendix gives pollution emissions from single and multiple chamber incinerators and estimated contaminants discharged from burning dumps. [Det. 4½ pp. 3 tab.]

West, R. F.

383. The Disposal of Hospital Refuse. *The East African Medical Journal*, 39:11:659, November 1962.

A general discussion of the disposal of hospital refuse. Incineration is found to be the most practical method. The article discusses basic design requirements of a hospital incinerator, special designs in hospital incinerators, universal and general-duty units, unusual problems in toxic waste disposal, and disposal of corrosive and radioactive wastes. [Gen. 4 pp. 5 ill.]

Xanten, William A.

384. The Urban Solid Waste Problem. *The APWA Reporter*, 29:8:16, August 1962.

Excerpts from a paper presented by Mr. Xanten at the Inter-American Association of Sanitary Engineers meeting in Washington D.C., in June 1962. Discusses in broad terms the problem of solid waste disposal in urban areas. Elaborates briefly on four factors which contribute to the severity of the problem: (1) the rapid increase in per capita production of solid wastes; (2) the changing quality of the wastes; (3) the scarcity of suitable sites for landfilling; and (4) the absolute necessity of preventing any long-range postponement of the collection of wastes so as to avoid pyramiding. [Gen. 2 pp.]

I. DISPOSAL—Composting and Reduction

Acevedo-Ramas, G.; Hernandez-Medina, E.; and Lugo-Lopez, M. A.

385. Effect of Filter-Press Cake on Crop Yields and Soil Properties. *Compost Science*, 3:4:34, Winter 1963.

Reviews results obtained at the Agricultural Experiment Station of the University of Puerto Rico from experiments conducted to evaluate the usefulness of filter-press cake. (Filter-press cake or filter-press mud is an organic byproduct of sugarcane mills.) The filter-press cake was used as a soil amendment, and was found to possibly produce significant increases in yields in such crops as pineapples, tomatoes, peppers, corn, and tobacco. However, application of the filter-press cake did not prompt similar responses in sugarcane, sweet corn, beans, pigeonpeas, yams, sweetpotatoes, and plantains. Measurements of filter-press cake effects on the composition of the soils were also made. Trends, such as the retention of larger quantities of available moisture at low tensions in a state of ready availability for plants by soils and narrow C/N ratios, were observed. [Det. 5 pp. 2 ill. 10 tab. 6 ref.]

Andres, O.

386. Agriculture and Compost. *International Research Group on Refuse Disposal Information Bulletin No. 65*, p. 6. August 1962.

Discusses the utilization and value of refuse and refuse sludge compost in agriculture. Soil improvement should be the primary consideration in the use of composts, and its nutrient effects should only be secondary. It is too much to expect that a compost will be able to increase crop yields in a single year; lasting improvement is generally to be expected only after several years of its use. Comparative studies of nutrient fertilizers and composts can result in erroneous conclusions concerning compost; soil-improvement means should not be compared with nutrient fertilizers. Compostable organic matter consists of both easily decomposable nutrient humus and of stable manure. The content of nutrient humus declines as composting progresses, and is essentially zero after complete decomposition. The ideal solution is surface composting in which losses in nutrient organic matter are at a minimum. Fresh material which has not been completely decomposed can supply nutrients to the microorganisms of the soil, but we still lack knowledge on how this material acts on the life of the soil. It has been shown that mature compost will improve soil conditions, resulting in increased crop yields and decreased plant disease and pests. However, compost should not be used in excess. Additions of nutrients, peat, microbial mixtures, and other materials to compost will only increase the cost of the compost and endanger its chances of success. (See item No. 387.) [Det. 7 pp. 17 ref.]

387. Agriculture and Compost. *Compost Science*, 4:1:41, Spring 1963.

Reprint. (See item No. 386.) [Det. 4 pp. 1 ill. 17 ref.]

Anonymous

388. "Bonamici" System in Spain. *Public Cleansing*, 52:3:108, March 1962.

Briefly describes a 40-ton-per-day refuse composting plant in Pamplona, Spain, which uses the "Bonamici" system, or accelerated fermentation with the addition of bacteriological culture. Refuse is weighed on arrival at the plant, discharged into a receiving hopper, and finally placed on a sorting belt. After salvable material is extracted, the refuse is pulverized with a hammer mill and treated with a solution to correct pH value and introduce the bacteriological culture. Fermentation lasts 9 days, after which the refuse is conveyed to storage containers for the final product. There are still several complications in the process which need to be corrected. [Gen. 1 p.]

389. In Bristol Fashion. *Public Cleansing*, 52:12:550, December 1962.

Describes the new composting plant at Bristol, England. The 120-ton-per-day plant uses a two-stage fermentation process with the interpolation of metal recovery and pulverizing between the two stages. Refuse is dumped into a collection pit while high pressure water sprays wet the material to reduce dust. The water carries with it the quantity of nitrogenous additive required to give a correct C/N ratio to the compost. Two one-ton grabs transfer the refuse to the primary fermentation cells. The cells, six in number, have a total capacity of 75,000 cubic feet and are divided by moving diaphragms. Fermentation in the primary cells is completed in 6 days, after which the grabs convey the semicomposted refuse to the conditioning plant where metals and salvable materials are extracted and the refuse is pulverized. Materials which are highly flexible do not break down from the impacts of the hammermills, and they are screened out and returned to the mill. After screening, the material in conveyed to the second fermentation stage where it remains for a period of 24 hours. [Gen. 2 pp.]

390. British Firm Building Indonesia Compost Plant. *Refuse Removal Journal*, 5:11:22, November 1962.

Describes the 300-ton-per-day compost plant being built by a British firm in the Tjempaka-Putih development area of Indonesia. Preparatory operations in the compost process include removing valuable materials such as paper and metals, pulverizing the remaining refuse, screening, and pulverizing a second time. After preparation the composting process begins. Water, or sewage sludge if available, is added to the refuse. The refuse is then taken to the compost house where it is fermented in troughs arranged on six levels. The fermentation process takes 6 days to be completed, after which the refuse goes through a 6- to 8-week maturation period. [Gen. ⅔ p.]

391. Compost and the Improvement of Shallow Stratified Soils. *Public Cleansing*, 53:7:320, July 1963.

Extracts from a paper by Dr. Ir. P. Buringh. Briefly discusses the improvement of stratified topsoil and subsoil by the application of composted urban refuse. The most important improvement is the increase in biological activity, which initiates the improvement of all other factors, such as water-retaining capacity, soil-air conditions, nutritive-absorbing ability, and soil temperature. Mechanical disturbance of stratified subsoils alone is not enough, for in a relatively short period all artificial holes disappear. Recent experiments in the Netherlands have shown that best results are obtained by adding organic material, such as fine grained urban refuse compost, during the mixing of stratified subsoils. [Gen. 1⅓ pp.]

392. Compost or Cover. *Public Cleansing*, 52:5:207, May 1962.

A Manchester, England, corporation is planning the establishment of a refuse handling plant to dispose of a quarter of the city's refuse and to solve the problem of local shortage of tipping space. The plant will house incinerators to burn 15 tons of trade refuse per day, and a unit which will compost 250 tons of crude refuse daily. Waste heat from the incinerators will be used to heat a carcase chamber, burn off organic matter from recovered tins, and heat water for adding to crude refuse to accelerate the temperature rise in composting. The Manchester plant will be the first composting plant with full thermal integration ever to operate in the world. The finished product will either be sold or used as cover material for the city's controlled tipping. [News. 1 p.]

393. Compost Plant at Kusnacht-Zurich. *Compost Science*, 2:4:48, Winter 1962.

A brief summary of an article in the Information Bulletin No. 11 of the International Research Group on Refuse Disposal. Describes the Kusnacht-Zurich, Switzerland, composting plant, which consists of a two-stage Bühler hammermill and a single Dano mixing drum without a biostabilizer. [News. ⅓ p.]

394. Compost Plant in Belgium. *Compost Science*, 4:1:48, Spring 1963.

Gives a report on the first Belgium compost plant at Anderlecht from *The Albert Howard News Sheet* published in London. The initiative was taken by two communities, Anderlecht and St. Gilles, members of the Intercommunal Society of Refuse Handling in Southwest Brussels. The present plant, designed to convert 30,000 tons of crude refuse into 20,000 tons of compost annually, used a Dano-Metepa biostabilizer system. Very few workmen will be required as automation will be introduced. [News. ¼ p.]

395. Compost Plant Successful. *Arizona Engineer-Scientist*, 6:11:12, February 1963.

Describes the Dano composting plant recently built and put into operation in Phoenix, Ariz. Refuse disposal is accomplished by a combined mechanical and biological disintegration process: the material is thoroughly shredded mechanically prior to being subjected to the biological processing. Heart of this processing are two biostabilizers 86-feet in length and 10 feet in diameter in which decomposition of organic materials takes place through a fast, efficient aerobic process. Two additional larger digesters are being installed and should be operational in March 1963. Several new and unusual pieces of equipment have been introduced at the Phoenix plant. Most important and impressive is the largest natural frequency vibrating feeder ever built. [Gen. 1⅔ pp. 1 ill. 1 diag.]

396. Composting. *Public Cleansing*, 53:2:65, February 1963.

Describes composting developments in the cities of Bristol, Twickenham, Middlesbrough, and Manchester, England. Experimental work with a small rotary digester for converting refuse into a usable compost product was so successful, that a prototype plant was erected in Middlesbrough. Composting plants will also be built in Bristol, Twickenham, and Manchester. All will use two-stage aerobic fermentation processes and will produce about 80 percent of compost by weight from domestic and trade refuse, without the addition of sewage. Describes the operations of the plants at Bristol and Twickenham, which, although differing in size, are similar in design. [Gen. 3 pp.]

397. Composting Development in Other Countries. *Public Cleansing*, 52:11:492, November 1962.

Briefly describes compositing developments in the Netherlands, Germany, Sweden, Spain, and the United States. Includes: (1) the Arnhem, Netherlands, plant, which employs the Westrate process; (2) the Enschede, Netherlands plant; (3) the Kuesnacht, Germany, installation, which contains a two-stage Bühler hammermill; (4) the Dano plant in Trolhattan, Sweden; (5) the "Bonamici" system in Pamplona, Spain, and (6) contract composting in Phoenix, Ariz. [Gen. 3½ pp.]

398. Composting Flourishes in a Hawaiian Prison. *Refuse Removal Journal*, 6:5:10, May 1963.

Describes the development of composting in Honolulu, Hawaii's Oahu Prison. The project was first begun to keep the inmates occupied, but it has developed into a productive means of disposing of the city's wastes. Prison officials and a Verdon, Nebr., manufacturer teamed up together to develop a rugged grinding machine which would reduce all kinds of waste materials without harming the machine. After grinding, the waste is stacked in rows for about 20 days while bacterial action transforms it into a usable compost. The prison composting program may have to be dropped in the future, however, because of problems involving prison competition with private fertilizer suppliers. [Gen. 1¼ pp.]

399. Composting for Disposal Spreading Throughout World. *Refuse Removal Journal*, 6:7:34, July 1963.

Points out that the composting movement started in England, and has spread throughout the world into such countries as Scotland, the United States, France, the Netherlands, Germany, Switzerland, Belgium, Hungary, Czechoslovakia, Thailand, Bavaria, Nigeria, the channel island of Jersey, the Union of South Africa, Costa Rica, San Salvador, and India, among others. Composting as a means of refuse disposal offers three solid advantages: it requires little space; it is unobjectionable, odorless, and can be carried on close to urban centers—reducing transportation costs; and it reduces labor expenses when set up on a mechanical basis. Compost end products do have resale value which could in time partially offset operation and plant costs. [Gen. ½ p.]

400. Composting in Switzerland. *Public Cleansing*, 52:1:39, January 1962.

Extracts from the paper, "The Significance and Methods of Evaluation of the Maturity of Refuse and Refuse-Sludge Composts," by Dr. P. Keller, Swiss Water Pollution Control Federation, Zurich, Switzerland. In Switzerland, potential compost consumers are chiefly market gardeners, winegrowers, and nurserymen. In all these fields, considerably greater compost application rates are used than in agriculture, and a higher quality compost is required. An essential requirement of compost derived from urban wastes is that it be free from pathogenic organisms, worm eggs, and weed seeds. These conditions are met by compost which has undergone appreciable thermophilic decomposition with temperatures over 45° C. The article lists five effects which should be attained through the use of compost. The use of mature compost leads to better results in most cases. Raw refuse may be more favorable under some circumstances, but special knowledge is required by the user to avoid failures. [Gen. 2½ pp.]

401. Composting in Toulouse. *Public Cleansing*, 52:2:68, February 1962.

Describes the operations of the composting plant at Toulouse, France, which uses the Prat system and gives chemical and physical composition of the compost. Among the unique features of the plant are no sorting or salvaging of refuse prior to the fermentation process, and a crushing operation which eliminates the glass nuisance. Estimates construction, labor, and operating costs for a typical 30-ton-per-day plant. Also describes the conversion of the composting plant at Narbonne, France, to the Prat Method, and cites plants at La Ciotat, Banyuls Collioures, and Agaccio, France, to be built in the future. The Prat system of composting appears to be developing in southern France to a very reasonable degree. [Det. 4 pp. 1 ill. 2 tab.]

402. COMPOSTING STUDIES. *Public Cleansing*, 52:5:204, May 1962.

Lists 12 items which should be considered by a municipality when deciding whether or not to compost refuse, and if so, how and where. Also describes the work of an investigation team of a London, England, company which studied the feasibility of establishing a compost scheme. The two fundamental functions of the team were: (1) to carefully carry out trials dealing with the physical characteristics of refuse; and (2) by searching questions and discussions, to consider and report upon the broader implications of a compost scheme. Gives figures to indicate how strong the demand is for this kind of study. [Gen. 3 pp. 1 ill.]

403. COMPOSTING? USE CONCRETE BUNKERS. *Parks and Recreation*, 46:2:72, February 1963.

Reprinted from Rural Concrete Builder No. 21, published by the Portland Cement Co. Describes the design and construction of four concrete bunker silos erected at the Ida Casson Callaway Gardens near Pine Mountain, Ga., for the composting of large amounts of grass, weed clippings, leaves, and other organic materials. Each bunker is 5 feet high, 20 feet wide, and 40 feet long with triangular buttresses, and has a capacity of approximately 100 tons of organic material. To provide space for loading the compost, a large paved area was constructed in front of each bin. The bins are covered with black polyethylene when they are filled with composting material. [Gen. 3 ill. 1 diag.]

404. CONCRETE BUNKERS FOR COMPOSTING. *Compost Science*, 3:3:42, Autumn 1962.

Tilt-up concrete bunker silos have solved a knotty problem at the Ida Casson Callaway Gardens, Pine Mountain, Ga. In the past officials at the Gardens have composted large amounts of leaves, grass, weed clippings, and other organic materials in large piles located in open fields. By covering these heaps with black polyethylene and treating the areas around them with chemicals, odors and flies have been controlled. Rainfall and seepage from the compost, however, often made the ground near the piles very muddy, creating difficulties in operating the loader. This problem was solved by erecting four tilt-up compost bunkers, each with a capacity of 100 tons of organic material. The article briefly describes construction and design of the bunkers. [Det. 2 pp. 3 ill. 1 diag.]

405. DUTCH NEED FOR ORGANIC MATTER. *Compost Science*, 4:2:30, Summer 1963.

A brief review of Holland's requirements for compost. Holland is one of the most densely populated countries in the world; there is only 0.59 acre of cultivated land per capita, compared to 3.7 acres per capita in the United States. The prospects of expansion in the Netherlands are also very limited, and reserves of waste land have virtually already been reclaimed. The land acquisition schemes will probably yield only enough land to offset losses of cultivated land resulting from town development schemes, road building, sports grounds, airports, and so on. The only possibility for agriculture to realize an increase of production is an increase in yield per surface-unit, which can only be achieved by intensification. According to a rough calculation there is a shortage of about a million tons of dry organic matter a year. One of the ways to meet this shortage is to utilize municipal refuse. [News. ⅓ p.]

406. FERTILIZER CONSUMPTION HIGHEST EVER. *Compost Science*, 4:1:28, Spring 1963.

Total quantity of fertilizer used in the year ended June 30, 1961, was over 25½ million tons—the highest yet recorded in the history of the United States. The use of natural organic products increased about 7 percent. These organic materials, which totaled over 525,000 tons, included dried blood, castor pomace, compost, cottonseed meal, fish scrap, dried manures, and sewage sludge. [News. ¼ p.]

407. FORECASTS BAN ON REFUSE BURNING AND BURYING. *Refuse Removal Journal*, 6:6:22, June 1963.

Dr. Edward deR. Cayia, a Florida physician who has taken a flat stand on the importance of refuse composting, has been presenting his views to various county and municipal legislative groups in hopes that action will be taken. Dr. Cayia points out that people in the Orient have been composting for many years and that their land has been farmed for 40 centuries and is still fallow. He claims that compost is superior to chemical fertilizers and that plants grown on compost land and cattle fed on compost-grown fodder are healthier. Dr. Cayia also urges the use of sewage and septic tank waste in composting to provide nitrogen and help break down woody substances. [News. ½ p.]

408. GARBAGE DISPOSAL AT BOY SCOUT CAMPS. *Compost Science*, 3:4:39, Winter 1963.

A brief description of how the composting process can be used as a method of garbage disposal and conservation education at summer Boy Scout camps. The process is accomplished through the use of a digestion pit, which may be constructed of poured concrete or blocks and should be made watertight. The pit should be used only for the disposal of garbage; paper and burnable trash are burned, and tin cans are smashed and buried. [Gen. 1 p. 1 ill.]

409. Hammering It. *Public Cleansing*, 52:1:9, January 1962.

Describes the Gondard system of refuse reduction, which represents an outstanding advancement in the application of a hammer crusher to the pulverization of municipal refuse. The plant consists of a modified type of multihammer impact crusher, with suitable feed arrangements. This machine has the usual discharge for the reduced product, and the top of the housing is open for the free egress of materials not readily reducible. The reduced product passes through a grid below the rotor and is discharged directly below the breaker. The Gondard breaker comprises a casing of welded plate well strengthened with rails on the outside. The lower portion is in one piece, with housings for the two roller bearings carrying the rotor shaft and the removable grids. The upper portion is in two halves with vertical bolted joint on the center line, and open at the top with provision for attaching breaker plates at the rear upper quadrant. There are four rows of steel hammers of the flat bar free-swinging type, 12 hammers per row. The reject tower is about 9 meters high from the rotor shaft to the top of the tower. It is designed to ensure that the rejected items have lost most of their velocity on approaching the top, where they fall into a hopper and are discharged into a vehicle or conveyor. [Det. 3¼ pp. 1 ill.]

410. The Hardy Compost Method. *Public Cleansing*, 53:12:594, December 1963.

Describes the Hardy system of refuse composting. Refuse is first pulverized and fed by means of a conveyor into a hopper from which it is gravity fed onto a second conveyor. This conveyor rotates round the circumference of the digester, distributing the pulverized refuse along the outer wall. Rotating screws fastened to a carriage revolve around the circumference with the second conveyor, and as they are propelled through the pulverized refuse, they cause the material to rise from bottom to top to be exposed to the air. When the composted material reaches a certain height, it overflows through the discharge port and passes on to a third conveyor which carries it to stockpile or storage. The entire mechanism is enclosed by a domelike structure. The plant does not require much ground space, and will produce sterilized compost in three days. [Gen. 2 pp. 1 diag.]

411. How They Sell Organic Fertilizer in California. *Compost Science*, 4:3:4, Autumn 1963.

Briefly describes the activities and extent of operations of a dairymen's cooperative in California whose function is to provide a corral-cleaning service to its 300 dairymen members and to market the organic fertilizer. In 1963 over 11.5 million cubic feet of fertilizer were sold producing a net profit of over $100,000. Gives figures on how the value of the compost and the pricing of the plant food is determined. [Gen. 1 p.]

412. How To Make Compost. *Compost Science*, 4:1:13, Spring 1963.

Translation of a pamphlet given to Taiwan farmers as part of an educational campaign which has made the Taiwan farms so productive. The pamphlet explains: (1) the importance of compost; (2) the effect of compost; (3) the making of compost—including selection of composting site, materials to use, the process of making compost (preparatory works, piling, and repiling), how to tell the degree of ripening of compost, and yield of the compost; and (4) the procedure for application of compost, which depends upon the soil, the climate, and the species of crop plants. [Det. 3 pp. 3 ill.]

413. How To Site the Compost Stack. *Compost Journal*, 20:6:14, December 1961—January 1962.

If convenient, the composting site should be in a central location to cut down the distance over which the raw materials to be composted and the finished compost will have to be carted. Sloping ground should be avoided, for it will become slippery in wet weather and the work of building the heap can be more easily carried out when the ground is level. If the site is well drained and the soil is light, the heap can be built directly on the ground, although any grass should first be removed and the ground dug over. If a bin is used, the size of the bin should be such that it can be filled with raw material as quickly as possible—certainly within 1 month. [Gen. ⅓ p.]

414. Indonesia Adopts Municipal Composting. *Compost Journal*, 21:4:25, August–September 1962.

A 300-ton-per-day composting plant is being constructed in the Tjempaka-Putih development area of Indonesia and is due to be completed by August 1963. The article describes the plant, which contains two 360-yard storage pits, two grabbing cranes, plate conveyors, hand-picking facilities, magnetic separators, swing hammer pulverizers, screening devices, equipment to add water or sewage sludge, six levels of fermentation troughs, and maturation areas. [Det. 2 pp. 1 ill.]

415. Jamaica Plant Described. *Compost Science*, 4:1:47, Spring 1963.

A brief summary of articles on the Kingston, Jamaica, composting plant which appeared in the Massachusetts *Patriot Ledger*, edited by John R. Herbert. The composting plant occupies about 6 acres and serves a total population of 450,000. Refuse is unloaded onto two stainless steel oscillating conveyors that move the material to a 36-inch wide rubber conveyor belt, leading to the first grinding operation. Initial grinder is a big hammermill with 7-inch grates that give an initial control to the density of the product; a secondary grinder has 3-inch grates. Another conveyor takes material to a large hopper where trucks move tons at a time to the composting area. Bacteria and water are added at this stage. The material is piled into heaps and turned every day for the first 4 days by a front end loader. [News. ⅓ p.]

416. The John Thompson Fermascreen Composting Unit. *Public Cleansing*, 53:7:326, July 1963.

Describes a composting unit designed by a British manufacturer. The unit consists of a hexagonal drum of varying capacity regulated by adjusting the flats of the hexagon and length of the drum. Three alternate sides of the hexagon are formed by perforated plate and each provided with a hinged door to completely seal the apertures. The whole drum is mounted on circular tracks which are supported by wheels to allow rotation of the drum. The unit is driven by either an electric motor or diesel engine. Pipes are included to enable the ingress of water or sewage sludge during rotation. After crude refuse is charged into the unit and moisture content adjusted, the drum goes through successive periods of rotation and rest, with the stationary periods being considerably longer than the rotating ones. During the rest periods, the doors covering the perforations are opened and aerobic fermentation takes place. After a few days of treatment the fermented material is agitated out of the drum through the perforations. Rejected material which remains in the drum after screening is discharged to a separate lorry. The composting system can be used by large communities as well as smaller communities and by institutions. [Gen. 2¾ pp.]

417. Largest Composting Plant in the World. *Public Cleansing*, 52:10:433, October 1962.

Tells about a compost firm which builds a wide range of composting facilities. The company was responsible for the installation of the world's largest refuse composting plant in Bangkok, Thailand. The plant, which is capable of handling 1,100 cubic meters of crude refuse daily, achieves aerobic fermentation in six levels of troughs in 6 days, after which the material is matured in heaps for a few weeks to lower the C/N ratio. [Gen. 1½ pp.]

418. London Centre Discusses Refuse Condensing Plant. *Public Cleansing*, 53:6:297, June 1963.

Briefly presents the contents of a paper by A. J. Barter, entitled "Refuse Condensing Plant." Discusses a new method of refuse treatment which would convert raw refuse into easy-to-handle, high-density cakes and enable high transport payloads to be obtained and landfill life to be increased. Briefly describes the plant which would process refuse in this way. The proposed plant could be designed to be semiportable and moved from landfill to landfill as the disposal sites were filled. A discussion follows the paper. [Gen. 5⅔ pp. 1 diag.]

419. Manure and Compost Effective Against Strontium 90 and Cessium 137. *Compost Journal*, 22:2:23, April–May 1963.

A group of Niigata University scientists said recently that farm crops can be protected from radioactive strontium 90 and cessium 137 by giving the soil as much manure, other barnyard waste, and compost as possible. In experiments strontium 90 showed a solution rate of 35.7 percent in acid soil, and the rate decreased to 4.77 percent with 10 percent of manure and compost added. [News. ½ p.]

420. Memphis Considers Composting After Inspection of Phoenix Plant. *Compost Science*, 4:1:18, Spring 1963.

Excerpts from a newspaper article which appeared in the April 21, 1963, issue of the Memphis, Tenn., *Commercial Appeal*, written by E. W. Brody. Explains that the city commissioner will propose to the city commission, establishment of a composting scheme to dispose of Memphis refuse. All but one city sanitary landfill will be completed within the next 2 years, and new landfills at greater distances will result in large increases in disposal costs in the future. The composting scheme would replace these cost increases, and may even prove cheaper than the disposal method presently used. [Ext. ½ p.]

421. Municipal Composting. *Compost Journal*, 20:6:15, December 1961–January 1962.

A general discussion of the increasing use of composting for municipal waste disposal. Composting is gaining wider acceptance because of the increasing costs of incineration and the increasing haul distances to the sanitary landfill. If composting is undertaken, a saving can be made for the taxpayers, as evidenced in Edinburgh, Scotland, and Hastings, England. A recent survey of composting schemes throughout the world has indicated a good demand for the compost in every case and a definite saving in cost in many cases. Sewage can be incorporated with the refuse, giving a better quality product. City engineers may not be keen on composting for it may mean another department for the engineer to look after; but this need not be the case, for the composting plant can be run either by contract or private enterprise. [Gen. 2 pp.]

422. A New Attempt At Refuse Pulverizing. *Public Cleansing*, 52:2:94, February 1962.

Describes the operation of a new refuse pulverizer designed to reduce transportation costs. Refuse is tipped from the collection vehicle onto a belt conveyor. Large material is removed by hand, while the remaining refuse is sent through a hammer and comb device, and passed over a series of grills to remove soil and cinders and through a magnetic separator to remove tin cans for salvage. The cinders are used for cover material, and the remaining pulverized refuse is dumped in the sanitary landfill. Tests show that there is a total reduction in volume of 40 percent without use of the magnetic separator. [News. 1 p.]

423. New Developments in Composting Equipment. *Compost Science*, 4:2:15, Summer 1963.

Reports on some of the more recently developed composting equipment. Includes: the Tollemache refuse pulverizer-sorter; the Fermascreen composting unit, which uses the principle of intermittent disturbance; a 5-day cycle, vertical tower composting plant; a refuse-reducing plant; a crushing unit; a magnetic separator; a mulch spreader; a manure disposal system; a pump for organic matter and straw; and equipment for spray irrigation. [Det. 5⅓ pp. 7 ill.]

424. £150,000 Composting Plant for Bristol. *Public Cleansing*, 52:1:32, January 1962.

The city council of Bristol, England, has approved the erection of a 120-ton-per-day refuse composting plant, based upon the fermentation principle. The plant will be housed in an aluminum-clad building 264 feet long by 55 feet wide. The refuse will be be taken from the reception hopper by two 1-ton grabs and placed into six fermentation cells each 105 feet by 12 feet by 10 feet for a period of 7 days. After fermentation, the refuse will pass under magnetic separators, and through electric nonferrous ejectors, picking belts, light screens, and pulverizers. The compost will then be elevated into two 60-foot silos to remain for a 2-day period before being discharged into vehicles. [News. ⅔ p.]

425. Organic Composting of Municipal Wastes. *Compost Journal*, 20:6:13, December 1961–January 1962.

Describes the composting scheme in Oamaru, New Zealand. The waste composted includes manufacturers' waste, refuse from seed-cleaning firms, flour mills, fish shops, poulterers, private persons, and seaweed, when available. The heaps, 100 feet by 30 feet by 7 feet, take 2 to 3 months to build; are kept in place by walls of hay bales 3 to 4 feet high; are covered with sawdust, hay, and earth so that they heat up quickly; and are turned after 5 or 6 months. After another month the matter is ready for screening. [Gen. 1 p.]

426. The Phoenix Compost Plant—A Progress Report. *Compost Science*, 4:1:17, Spring 1963.

Gives excerpts from articles which appeared in the *Fort Lauderdale News* of March 11–15, 1963, written by Doris Fortune concerning the progress of the Phoenix, Ariz., compost plant. The articles report that there still remain many complications which need to be corrected. The plant is turning out an inferior product, according to the Fort Lauderdale newspaper, and the addition of two new digesters may improve its quality. The *Fort Lauderdale News* is especially interested in the Phoenix installation, because the same company which owns and operates this plant has offered to build a compost plant for the city of Fort Lauderdale, Fla. [Ext. ⅔ p.]

427. Phoenix Compost Plant Has Started Operation. *Refuse Removal Journal*, 6:3:8, March 1963.

A complete discussion of the new composting plant in Phoenix, Ariz. Includes descriptions of the major pieces of equipment in the plant (biostabilizers and feeder), how the city decided upon composting its refuse instead of incinerating or landfilling, and a brief sketch of the process through which the refuse goes. [Gen. 2⅔ pp. 4 ill.]

428. Phoenix Compost Plant Temporarily Closed. *Compost Science*, 4:2:30, Summer 1963.

The Phoenix, Ariz., compost plant has been temporarily closed because of lack of financial support. John Valianos, president of the company which owns and operates the plant, has admitted that his company has had to experiment and learn by making mistakes, but that the finished product is of excellent quality. The plant has been processing only 250 tons of the daily collection of 800 tons of refuse. The city has been paying $1.25 a ton to the company for accepting refuse, which roughly approximates the cost of disposal by landfill. [News. ⅓ p.]

429. Phoenix Goes Over to Composting. *Public Cleansing*, 52:1:35, January 1962.

A full-scale commercial composting plant is to be established in Phoenix, Ariz., under a contract between a private company and the city. The plant will be built on land adjoining the city's sewage treatment plant and will have a capacity of 300 tons of refuse per day. Construction of two additional plants of the same size at a later date is also provided for in the contract. Once the three plants are in full operation, the city will be able to discontinue its landfill operations. The contract calls for the city to pay a fixed fee for each ton of refuse delivered to the compost plant, with a minimum annual payment of $103,750. Beginning with the 13th month of operations, the city is to receive a percentage of the gross compost sales. [News. ½ p.]

430. Phoenix Plant Begins Operation. *Compost Science*, 3:3:29, Autumn 1962.

The first of three proposed composting plants in Phoenix, Ariz., recently began operations. The whole complex is located next to the city sewage plant. The plants are ultimately designed to handle one-third of the estimated one million tons of refuse generated by the city each year. Refuse will be converted into a soil conditioner which will be marketed; salvageable materials, such as cans, paper, and glass will be sorted and disposed of in other markets. Under a 20-year contract, Phoenix will pay the compost company $1.25 per ton of refuse disposed of the first year, and $1.10 per ton thereafter. The Phoenix plant employs the Dano composting process. [News. 1 p. 1 ill.]

431. Pittsburgh Firm Announces Bottle and Can Crusher. *Refuse Removal Journal*, 6:3:32, March 1963.

Describes a new, high-speed can and bottle crusher produced by a Pittsburgh, Pa., manufacturer. The machine, which can crush 5,200 No. 10 cans per hour and can handle containers as large as 2-gallon cans and 5-quart bottles, utilizes opposed converging crushing tracks. Can and bottle crushing equipment is widely used to save trash storage space, cut handling costs, and quickly and safely dispose of the mass of potentially dangerous bottles and cans that accumulate at many institutions and plants. [News. ⅔ p. 1 ill.]

432. PROBLEMS OF COMPOSTING. *Public Cleansing*, 52:4:167, April 1962.

Extracts from a paper by A. G. Davies presented at the meeting of the Soil Association in March 1962. Touches upon these points of controversy in the field of composting: (1) installation and operation costs; (2) value of the product; (3) marketing of the compost; (4) government support of research and construction of compost plants; and (5) dual control by officers concerned with sewage and solid wastes disposal. [Gen. 3 pp.]

433. QUESTIONS AND ANSWERS ON COMPOSTING. *The American City*, 78:9:119, September 1963.

Gives questions posed by David C. Rowlands, city manager of Tacoma, Wash., about the composting operation in Phoenix, Ariz., and answers to these questions from Fred Glendening, public works director of Phoenix. The questions concern the material which is and is not composted, the market for the compost, traffic around the plant, the material produced, revenue derived, and landfill facilities needed. [Gen. 1 p. 1 ill.]

434. REFUSE COMPOST—WHAT IS ITS VALUE IN AGRICULTURE AND HORTICULTURE? *Public Cleansing*, 53:7:345, July 1963.

Briefly summarizes valuable knowledge about the value of refuse compost in agriculture and horticulture. Explains that: (1) Consensus in Europe (where refuse compost production has been established for many years) is that refuse compost is a soil builder which replenishes the organic matter of the soil and is complementary to fertilizer; (2) physical soil fertility is as important as chemical soil fertility; (3) if based only on chemical contents of the soil, the determination of the value of refuse compost is useless; (4) a more productive method of determining the value of compost lies in agronomic research and studies of yield produced through compost application to the soil; (5) European findings indicate a delayed benefit of compost application; and (6) more benefit is obtained with plot or field studies, rather than pot trials. [Gen. 1½ pp.]

435. THE ROTARY COMPOST BIN. *Compost Journal*, 20:6:25, December 1961–January 1962.

A recent innovation in backyard composting is the rotary compost bin. The main object of the rotary bin is to get the material in the best possible condition for breaking down, by adding air and moisture. The raw material is chopped into 4-inch lengths and kept on the dry side. If too dry, it is moistened with liquid manure. The material is left in the bin for 2 weeks or longer if necessary, with daily turning, after which it is emptied into one of three boxes. The rotary bin is then filled a second time, and after 2 weeks this material is emptied into the first box, with the contents of the first box transferred to the second, and so on. The whole operation takes 8 weeks. A diagram of the rotary bin is given. [Gen. 1 p. 1 diag.]

436. RUBBISH, GOOD TO THE LAST SCRAP. *Engineering News-Record*, 169:18:49, November 1, 1962.

Briefly describes a refuse disposal and reclamation system using bacteriological reduction and a carbonization process which, it is claimed, will convert nearly 100 percent of domestic refuse into salable byproducts. All refuse travels through salvage operation on conveyor belts and is sprayed with disinfectant-deodorant. Cardboard, rags, metal, and glass are separated, while the remaining refuse is diverted either to the composting plant or the distilling plant. Raw sewage solids, digested sewage sludge, and/or wet garbage are used as moistening agents for the dry refuse in the composting process, thus speeding up the process and improving the end product. After 6 days in a digester, the material is ground, screened, and bagged. The distillation process utilizes selected and sized material fed into a converter retort, where it is carbonized by indirect application of heat, cooled, classified, and stored for further processing. The end products are charcoal, methane gas, and cresotars. [News. ½ p. 1 diag.]

437. SELLING COMPOST. *Public Cleansing*, 52:10:442, October 1962.

There are two broad classifications within which selling arrangements can be grouped—individual arrangements by each local authority, and a regional or national selling organization. Few local government officers have any selling ability, while specialist activity is proving to be the more successful in the world today. Mentions the possibility of selling small quantities of compost through chain stores. Cites one particular fertilizer with a formula reminiscent to that of compost which has found a successful market in 3-ounce paper containers. Specialized selling would involve a study of market conditions in the area, which would include a determination of existing fertilizers and fertilizer prices. (See item No. 438.) [Gen. 1⅔ pp.]

438. SELLING COMPOST. *Compost Science*, 3:4:11, Winter 1963.

Reprint. (See item No. 437.)

439. 30 MILLION TONS OF FERTILIZER NEEDED. *Compost Science*, 3:1:43, Spring 1962.

Fertilizer needs of the world's less-developed countries are expected to rise to 30 million tons per year by 1980 from the present level of 5 million tons, according to a report issued by the Food and Agriculture Organization. Approval has been given for the FAO program to accelerate fertilizer use in the less-developed areas under its Freedom-From-Hunger Campaign. The Fertilizer Industry Advisory Panel, representing the world fertilizer industry, has pledged more than $570,000 for the program, along with $10,000 worth of fertilizer to be used for field work. It would appear worthwhile for composting firms to investigate the possibilities of cooperating in this program. [News. ⅓ p.]

440. Tollemache System for Processing Refuse and Sludge. *Compost Science*, 2:4:47, Winter 1962.

Summarizes a report in the Information Bulletin No. 10 of the International Research Group on Refuse Disposal, December 1960. Briefly describes the Tollemache process, developed at the refuse composting plant in Mabelreign, Southern Rhodesia. Refuse passes on a system of conveyor belts where ash, salvage material, glass fragments, and rocks are extracted. After the addition of water or sludge, the refuse is discharged into composting chambers. The fermentation silos have a perforated concrete floor which permits forced aeration. From time to time the compost is mixed and pulverized by a traveling turner-mixer. Also gives analysis of compost after being in fermentation chambers for 2 weeks and cost of plant. [News. ½ p. 1 diag.]

441. A Versatile Sorter-Pulverizer. *Public Cleansing*, 53:9:457, September 1963.

Describes a sorting-pulverizing machine in use near Eastbourne, England. The machine consists of a hammermill and ballistic separator. Unsorted refuse is fed into the top of a conical receiving hopper and ungrindable items are thrown out by the separator located at the bottom of the cone. Rejected materials include metals, polythene bottles, rubber, and some wood, constituting approximately 4 percent by weight of the unsorted refuse. The product from the pulverizer is finely ground homogeneous material and represents less than half of the refuse's original bulk. The machine can be used advantageously at transfer stations reducing the bulk of the material to be hauled to distant landfill sites; or it may be used at a composting plant before or after the composting process. Suggests that the finished product may also be sold directly to farmers for spreading on level ground where it will gradually mature to compost. [Gen. 1½ pp. 1 ill.]

442. Waste, Not Want, Pays Off for New Industry. *Gas*, 39:12:132, December 1963.

Briefly discusses a new industry, Salvage and Conversion System (SACS), which collects trash, grass cuttings, and all sorts of odds and ends tossed out by homeowners or commercial and industrial customers and converts them into garden compost, charcoal briquets, metal salvage, and other useful items. Basically SACS consists of three interrelated systems with three distinct end products: hand sorting and removing of glass, metal, plastic, cardboard, rubber, and other items that can be baled or melted down and sold for reuse; pulverization and decomposition, resulting in a clean, odorless, extremely rich garden compost which is bagged or stored for bulk sales; and the Lantz process, where selected and sized material is fed to a gas-fired unit which produces high quality charcoal briquets. [News. ⅔ p. 1 ill.]

Arnold, David C.

443. Bacterial Decomposition and the Origin of Domestic Fire. *Compost Science*, 3:1:12, Spring 1962.

A British anthropologist reviews the various theories as to how man first came to use fire and the several disadvantages of these theories. He then advances and develops his "compost heap" theory of the origin of the use of fire. The problem resolves into the question of how fire could have been produced within or close to the habitations of early man in an easy and natural manner without becoming dangerous or terrifying. A simple solution is provided by the warmth of the compost heap. Use of fire was probably preceded by the use of heat derived from the bacterial decomposition of the plant material used for bedding. At times such beds would burst into flames, producing a startling effect and inconvenience rather than a terrifying effect and danger. [Gen. 2½ pp. 1 dr. 7 ref.]

Banse, Hans Joachim

444. Experience With Garbage Compost in Vine Growing Areas. *Compost Science*, 3:2:19, Summer 1962.

Adequate humus supplies in vine land represent today an essential but very delicate problem. Greater attention should be devoted to the maintenance of organic matter present in crude garbage if there is to be fruitful cooperation between officials in charge of urban garbage disposal services and vine growers. In view of the ever more difficult labor situation, composting plants will have to contemplate the possibility of transporting and distributing at least part of the compost to the vine lands to increase chances of good sales. Distribution of the compost should be highly mechanized. The article discusses possible dispensing machines, application rates, and soil improvement (physical) abilities of garbage compost. The essential value of garbage composts for vineyards does not lie in a possible nutrient effect, but rather in the supply of organic substances capable of forming humus and in an amelioration of the physical properties of the soil. The composts help prevent soil from washing off slopes; they facilitate work on heavy soils; they provide an all around improvement of soil structure; and they have a marked effect on the water balance of soils used for vine growing. [Gen. 2 pp. 2 ill.]

Black, Ralph J.

445. Recent Composting Developments in the Netherlands. *1963 American Public Works Association Yearbook*, p. 199.

Briefly describes operations at the Arnhem composting plant, which is one of the newest rasping system installations, and the Soest-Baarn plant, which uses continuous mechanical composting with positive aeration. Also discusses briefly the activities of the Dutch government in promoting composting in the Netherlands. [Gen. 2½ pp. 10 ill. 4 ref.]

Braun, Rudolf

446. UTILIZATION OF ORGANIC INDUSTRIAL WASTES BY COMPOSTING. *Compost Science*, 3:3:34, Autumn 1962.

Object of this paper is to give some examples of utilizing organic industrial wastes by means of composting. Emphasizes that composting may not be economical in every case, however. As background material before going into detail on the specific wastes, the article discusses the theory of decomposition, and five prerequisites for good composting (favorable substratum of fermentation, favorable carbon-nitrogen ratio, optimum water content, good aeration, and sufficient microorganisms). The groups of wastes which are discussed include wastes from: (1) food and related industries; (2) industries engaged in exploitation of vegetable and animal wastes; (3) textile industry; (4) leather, glue, and gelatine industry; (5) pharmaceutical industry; (6) petroleum industry; and (7) wood and paper industry. Also discusses spent sulfite liquor as a supplement in the composting of kitchen waste, and the importance of compost markets. [Det. 8 pp. 3 ill. 5 tab. 1 gr. 12 ref.]

Buringh, P.

447. CULTIVATION OF WASTELAND WITH COMPOST. *Compost Science*, 3:2:22, Summer 1962.

Contends that the possibility of adding fine grained organic matter or urban refuse compost to certain subsoils in order to stimulate and increase root development is very important. Greater root development means that conditions for plant roots, plant growth, and crop production are more favorable Root development depends upon location of the zone of stratification in the soil: If stratification is present in a soil at a shallow depth, there is only a limited volume of soil available for root development; if the zone of stratification begins at a greater depth, increased root development will occur. Stratification of soils has an important influence upon soil conditions—moisture, air, temperature, nutrient, and biological conditions, and these conditions affect root development. The addition of urban refuse improves these soil conditions in all respects, but because it is mostly applied to the upper part of the soil, it does not contribute to the deepening of root development to any great extent. The practice of mechanical mixing of stratified subsoil combined with the addition of organic material will, however, result in disturbance of subsoil stratification, initiation of favorable conditions for biological activity in the subsoil, and increased root development. [Gen. 2 pp.]

Davies, A. G.

448. BRISTOL, ENGLAND BUILDS COMPOST PLANT. *Compost Science*, 3:3:44, Autumn 1962.

Briefly describes the operation of the 120-ton-per-day compost plant in Bristol, England. The process employed is two-stage static fermentation with the interpolation of a metal recovery and pulverizing unit between the two stages. Incoming refuse is dumped by the collection vehicles while they are within the composting building and high pressure water sprays wet the refuse during tipping to eliminate the dust problem. The water contains nitrogeneous additives required to give a correct carbon-nitrogen ratio to the compost. Two 1-ton grabs move the refuse to the primary fermentation chamber, which consists of six cells. Within three days the refuse rises to optimum temperature of 150° F., at which time thermostatically operated air lances inject air into the refuse mass. The fermentation in the primary cells is completed in 6 days, after which the refuse goes to the conditioning plant to be sorted and pulverized. [Det 1 p.]

449. COMPOST PLANT AT ENSCHEDE, HOLLAND. *Compost Science*, 3:2:48, Summer 1962.

A brief account of operations at the composting plant in Enschede, the Netherlands. The plant is located alongside the sewage treatment works so that sludge can be mixed with garbage to obtain a high-quality compost. [News. ½ p.]

450. AN ENGLISH AUTHORITY EVALUATES COMPOST. *Compost Science*, 4:3:30, Autumn 1963.

Based on a report which appeared in the September 1963 issue of *Public Cleansing*. (See item No. 451.) [Gen. ⅔ p.]

451. EVALUATION OF COMPOST. *Public Cleansing*, 53:9:434, September 1963.

Contends that the importance of the selling of municipally produced compost is dwarfed entirely by the issues of soil structure and disease dissemination. Discusses the value of compost as a soil builder or soil amendment: compost improves soil structure, makes plowing easier, permits greater water retention to carry over during drought and to prevent erosion by wind and rain, increases soil organic matter and micro-organism activity, and provides a limited amount of major plant nutrients and probably adequate amounts of most trace minerals needed by plants. Also discusses the importance of composting in pathogen destruction. This results from two actions in the composting process—thermal kill by sufficiently high temperature, and kill by antibiotic action or by the decomposing organisms or their products. (See item No. 450.) [Gen. 3 pp. 1 tab.]

452. A REALISTIC APPRAISAL OF COMPOSTING. *Compost Science*, 3:4:21, Winter 1963.

England is currently faced with the problem of disposing of over 12,000,000 tons of domestic waste each year. According to the author, composting seems to be the best method of dealing with this refuse, for it not only provides a hygienic means of disposal, but also returns organic waste to the soil. On the question of health risk, there is a parallel between composting and milk pasteurizing: both refuse and milk are subjected to high temperatures which destroy the pathogenic bacteria present in them. Belgium experiences, along with experiences in several other countries, have shown that compost is a very active means of enriching the soil both for agriculture and horticulture. Its fertilizing power enables barren land to be recovered and impoverished soil to be improved. The main points of controversy are cost of a composting installation and compost selling. Plants already in operation offer sufficient evidence to suggest that installation and operating costs compare quite favorably with those of incineration. It is quite possible for the local authority to sell compost itself, provided the quantities are not too large. However, as composting becomes a more common practice, organizations specifically for the selling of compost will have to be established. Two principles must be understood at the outset for composting to be a success: it is not prudent to expect a profit from composing operations; and where proposals include the use of sewage sludge, full sludge disposal should not be expected. [Gen 2½ pp. 1 ill.]

Den Dulk, P. R.

453. Use of Compost in Horticulture. *Compost Science*, 3:2:14, Summer 1962.

A brief report of Dutch experiments on the effects of manure and compost on soil structure, mineral content, and crop yield. In Herwijnen, where soil is heavy with a poor structure, both stable manure and town waste compost had some influence on structure. In the upper 20 centimeters, the influence of the compost was much more important than that of the manure; between 20 and 40 centimeters of depth, the compost had no influence and the manure had a significant influence. Both the town waste compost and stable manure increased pH-value, but the manure to a lesser extent. Organic manure and compost were found to influence plant disease, but only in a few incidental occasions, and not always in favor of the organic manure. Stable manure was found to increase crop yield the most (in sandy soils), followed by town waste compost, sewage sludge compost, and no manure. [Gen. 1½ pp. 1 ill. 1 tab.]

Elliott, Douglas

454. Compost Making. *Compost Journal*, 22:5:14, October–November 1963.

Compost makes the soil truly fertile in a way that artificial fertilizers can never do. The soil is full of tiny living organisms which feed on humus, and the best source of humus is compost. Mycorrhiza is a kind of fungus which develops in humus and links up with the roots of plants to feed them; artificial fertilizers are definitely lethal to mycorrhizal formation. There are two main methods by which the gardener can compost—the biodynamic method and the Indore process. The Indore process, which is the simpler of the two, may use a heap or a bin. A 6-inch layer of vegetable wastes is made first (weeds, old plants, soft hedge clippings, leaves, kitchen waste, and grass clippings), followed by a 2-inch layer of animal or poultry manure, a sprinkle of wood ashes or ground limestone, and a ¼-inch layer of soil. If the materials are dry, each layer should be watered. A vent in the bottom of the bin (if used) to let in air or a few holes through the entire mass helps decomposition. The materials should also be covered to keep in warmth and keep out excessive rain. [Gen. 1¼ pp.]

455. Mechanical Composting in New Zealand. *Compost Journal*, 22:1:17, February–March 1963.

The first mechanical method of composting on a commercial scale in New Zealand is now in operation in New Plymouth. Apart from some minor variations, the plant is a complete Tollemache unit, but one of the smaller and simpler models. It is capable of handling 18 to 20 tons of waste material each week. The waste materials consist mainly of fish-shop and restaurant waste, spent hops from the local brewery, sawdust, grass, and roadside waste. All of the waste is dumped into a concrete silo, 60 feet long, six feet wide, and five feet deep, where it is turned daily by an electrically-driven spiked drum. During the process the material is aerated and reaches a temperature of 110-120 degrees Fahrenheit. The process lasts a period of six weeks. [Gen. 2½ pp. 3 ill.]

Frangipane, Eugenio de Fraja

456. Composting of Solid City Waste. *Compost Science*, 3:2:9, Summer 1962.

Examines the technique of refuse composting and analyzes the various major methods of composting available at the present time, restricting the discussion to those methods which are sanitary, technically correct, and economically feasible. Includes: mechanical treatment—homogenization (crushing), screening, and elimination of glass; biological treatment—anaerobic and aerobic composting; mechanical treatment in crushers; mechanical treatment by rasps; and dynamic systems (those which keep the material in constant movement, submitting it simultaneously to humidification and aeration in optimum proportions). [Gen. 3½ pp. 2 ill.]

Friedman, J. H.

457. Safe Disposal of Waste Solids. *Compost Science*, 4:3:5 Autumn, 1963.

Describes how a large manufacturer of antibiotics solves its waste disposal problem by composting. After considering all possible disposal methods, it was decided to concentrate on composting. Studies were made to determine if the company's sludge could be composted, and if so, to determine if a routine composting procedure could be established so that the material could be sold or used for suitable landfill. From the pilot plant data, it was evident that effective composting could be carried out for a relatively small expenditure. In the beginning, composting was carried out on a short-cycle basis; but as commercial demand for the compost waned and waste production grew, long-term composting replaced the short-cycle. At present the sludge, dewatered on vacuum filters, is trucked to the composting site and dumped on a prepared bed of sawdust and animal manures. Some of the preceding day's material is added to provide seeding. The mass is then mixed and is piled in a windrow.

Normally, complete composting is accomplished in 5 months. Describes some new problems which have presented themselves due to changes in the waste streams and filtration requirements. Also three considerations of importance to insure that the disposal method is safe, and other points essential for composting which the company has found in its experiences. [Det. 4 pp. 8 ill.]

Fullard, P. F.
458. Cleaner Than Many Food Factories. *Public Cleansing*, 52:9:391, September 1962.

Describes the Gondard Refuse Reducer recently put into operation at Annecy Haute Savoie France. Refuse is first tipped into a reception pit 100 feet by 40 feet by 30 feet deep. Opposite the tipping gap is an extractor fan which draws up dust and smell from refuse in the pit. A hydraulically operated grab transfers the refuse to a hopper on a conveyor belt which leads to the reducer. Reject refuse is discharged through the reject chute to a receptacle at the end of the building. The remaining refuse moves up an inclined conveyor belt and over a magnetic roller which separates the metallic material. The metallic objects are air cleaned, dropped into a hopper, and eventually sold as clean metal scrap. Plant staff consists of a foreman, a mechanic, and a laborer. The whole building and surroundings are remarkably clean, no smell is noticeable and operations are quiet. Sale of the end product and scrap metal is expected to more than cover capital charge interest and operating costs. City officials envision the daily municipal refuse load to increase to 180 tons within the next few years, with which the plant should cope with comfortably. [Gen. 2½ pp.]

Giddens, Joel
459. Feather Meal as a Fertilizer Nitrogen Source. *Compost Science*, 4:2:20, Summer 1963.

An experiment was conducted to compare the rate of nitrogen release from feather meal with that from cottonseed meal, one of the older organic sources. Varying amounts of both feather meal and cotton-seed meal were mixed with an acid sandy loam soil which contained adequate mineral elements and moisture and incubated at 80° F. At intervals, the soils were extracted and the nitrogen remaining in nonmineralized form determined by the Kjeldahl method. Both feather meal and cottonseed meal broke down rather rapidly and over one-half the nitrogen was released after 1 week of incubation. Practically all the available nitrogen was released after 3 weeks' incubation. Data indicates that feather meal is suitable as a source of nitrogen for corn. [News. ½ p. 1 gr. 1 tab.]

Glathe, H.
460. Microbiological Processes in Composting. *Compost Science*, 3:2:8, Summer 1962.

Briefly discusses some of the microbiological processes occurring in the compost process. In order to protect organic substances at various temperatures, it would be desirable to secure as rapid a temperature rise as possible. Sanitary considerations, nevertheless, prevent such procedures whenever pathogenic, spore-foaming agents appear, such as anthrax. Results obtained from studies in Giessen, Germany, indicate that a minimum temperature of 55° C. over 14 days and a humidity content of 40 to 60 percent should be promoted. Lists three conditions which, if followed, will destroy anthrax agents. During the cooling stage of the microbiological composting process, mesophilic germs appear in as great numbers as at the beginning. The article discusses possible reasons for their origin. [Gen. 1 p.]

Glockner, M.
461. An Inquiry on Ground Preparation for Windrow Areas. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 26. May 1963.

Describes the windrowing area of the refuse composting plant at Stuttgart-Möhringen, Germany. The plant operates under the Dorr-Oliver system (rasping with windrow composting). The windrowing area is 50 meters by 80 meters; it is built lengthwise in the shape of a roof at a 4-percent slope. The area has a simple macadam cover: 5 centimeters of filter layer, 15 centimeters of coarse gravel, and 5 centimeters of rolled gravel including a macadam cover. The cover has been very satisfactory. Other than a few repairs in the first few weeks, the cover has not required much care. Fine particles of compost have formed an almost concretelike covering during dry weather which has protected the macadam paving. There have been no disadvantages experienced due to softening during rain or melting weather. The macadam cover also has appreciable drainage capacity so that there is very little runoff water even in the heaviest rainfall. [Det. 1 p.]

462. The Refuse Composting Plant at Stuttgart-Möhringen. *International Research Group on Refuse Disposal Information Bulletin No. 15*, p. 15. August 1962.

A brief résumé of composting experiences in Stuttgart-Möhringen, Germany, where a new refuse composting plant began operations in October 1961. The Stuttgart works is a combination composting plant and incinerator, suited to the needs of a middle-sized city (650,000) where it is impossible to solve the total refuse problem by composting alone. The plant operates under the Dorr-Oliver system (rasping system with windrow composting); the composting unit converts waste from the suburban areas of the city, while the incinerator disposes of industrial wastes. Compost sales results are very satisfactory, but any increase in production will cause increased difficulties in sales. Final judgment about operation of the composting plant must await a long period of operation. [Gen. 1½ pp.]

Golueke, Clarence G.
463. San Fernando Plant Uses "Total System Concept." *Compost Science*, 3:3:5, Autumn 1962.

A complete description of the refuse composting plant in San Fernando, Calif., which uses the

Naturizer process. The plant contains the following equipment (in the same order in which incoming refuse is processed): receiving hopper and metering device; salvage conveyor belt, from which rags, metal, glass, and paper are extracted; primary grinder; magnetic separator and trommel screen; equipment for the injection of moistening agents; pulverator; vertical primary and secondary digesters, each of which contains three cells; second stage and final grinder; screen separator; and bagging plant and bulk shipping bins. The sorted, moistened, and pulverized refuse is fermented in the two digesters for a total period of 6 days, or 1 day in each of the digestor cells. Maximum bacteriological activity is promoted by units which control moisture, temperature, and aeration. Aeration of the composting material is accomplished by dropping the material daily from one cell to the next. The plant produces two grades of compost—a coarse grade in bulk for use in soil erosion and agriculture, and a fine grade which is sacked and sold as a soil conditioner to the home gardener. An interesting feature of the San Fernando operation is its "total systems concept": the corporation which owns the plant provides collection equipment, salvage and salvage sales, conversion equipment, and a complete marketing organization for the finished product. [Det. 4 pp. 4 ill. 1 diag. 2 ref.]

Gotaas, Harold B.

464. MUNICIPAL SOLID-WASTE DISPOSAL—PART V. *The American City*, 77:6:190, June 1962.

A discussion of composting as a means of municipal solid waste disposal. Includes: (1) two deterrents to composting municipal waste; (2) the advantages of aerobic decomposition; (3) the quantity and quality of refuse and the quality of compost, with tables giving the amounts of salvable materials in municipal refuse and the chemical composition of compost; and (4) the marketing of compost. (Continued. See item No. 466.) (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Det. 2½ pp. 1 ill. 2 tab. 1 ref.]

465. MUNICIPAL SOLID-WASTE DISPOSAL—PART VI. *The American City*, 77:7:103, July 1962.

A continuation of the discussion of composting as a means of municipal solid waste disposal (see item No. 464). Discusses the design and operation of a compost plant. Includes a list of the fundamental factors which affect plant design, and gives the features which should be included in the six basic processes of a plant: receiving of the refuse; separation of salvable materials; removal of noncompostable materials; preparation of the remainder by screening, grinding, and shredding; biological decomposition and stabilization by composting; and preparation of the compost for marketing by screening and milling, fortifying with additional nutrients when desired, and bagging. Talks briefly about composting both refuse and sewage sludge. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) (See item No. 464.) [Det. 2½ pp. 1 ill. 1 diag. 5 ref.]

Gotaas, Harold B.; and Mandelblit, N.

466. ECONOMICS OF COMPOSTING MUNICIPAL REFUSE. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*. 89:SA2:113, February 1963.

Discussion of the article entitled, "Economics of Composting Municipal Refuse," by Hillel I. Shuval. (See item No. 520.) Mr. Gotaas examines composting in the United States, attempts to explain why composting has not been overly successful in this country, and tells how the situation could be improved. Reasons for the failure of composting in the United States probably include: insufficient demand for the compost product; competition with soil bank and other conservation methods; the horticulture market being too small to utilize much of the organic wastes from cities; competition from the chemical fertilizers, which are available at relatively low cost; and lack of interest on the part of the city in undertaking the business of processing and selling the compost products. Mr. Mandelblit, in his discussion, questions whether Mr. Shuval can make a meaningful comparison of the Haifa and Tel Aviv plants; he points out that the two plants differ in size and volume, and that one of them has not even begun operation, which means that the figures given on this plant are hypothetical. In addition, the refuse in Israel differs from the refuse in other countries, creating complications in operating and cost comparisons. Three tables are presented comparing the two plants, giving general background data, and production and unit costs and revenue. The assumption is made, however, that the plants are of similar size and that the compost produced is of similar quality. [Det. 5 pp. 3 tab.]

Grindrod, J.

467. BANGKOK PLANT COMPOSTS MUNICIPAL REFUSE. *Compost Science*, 2:4:14, Winter 1962.

Describes a new $20 million mechanized refuse composting plant in Bangkok, Thailand. The plant, which is capable of handling 38,000 cubic feet of municipal waste daily, is claimed to be the largest municipal, mechanized, garbage, composting plant in the world. Heart of the installation is a six-floor fermentation chamber, each floor of which consists of two rows of troughs perforated for aeration purposes. As the refuse enters the fermentation building, it is thrown off the conveyor belt, by means of a specially developed travelling tripper, to a shuttle conveyor which spreads it evenly over the troughs on the top floor. By inverting the troughs daily, the mixture can be passed downward through successive floors of the building. In passing from floor to floor, the refuse is automatically turned and aerated. By the time the refuse arrives at the ground floor, it is a safe, sterilized material ready for maturing in stockpiles over a period of 6 to 8 weeks. [Det. 2 pp. 2 ill.]

Guliakin, I. V.; and Korovkina, A. V.

468. Organic Matter, Soil Composition and Fission Uptake. *Compost Science*, 2:4:12, Winter 1962.

Results of an experiment with oats and peas conducted to ascertain the effect of organic matter on plant uptake of radioactive isotopes (strontium, cesium, and cerium) from soils of varying mechanical composition. Sandy loam soil and loamy soil were used in the experiment. The addition of humus to the soil caused a significant reduction in the uptake of radioisotopes by the oat and the pea plants. The drop in radioisotope content of the plants was particularly marked in sandy loam soil. However, the plants took up much greater quantities of the radioactive isotopes from the sandy loam soil than from the loamy soil. [Tech. 1½ pp. 1 ill. 4 tab.]

Guliakin, I. V.; and Yudintseva, E. V.

469. Effect of Organic Matter on the Accumulation of Fission Products in Crops. *Compost Science*, 2:4:9, Winter 1962.

Describes a study of the effect of lime and organic matter (as factors producing variations in the sorptive properties of soil) on the uptake of fission products by agricultural plants and their accumulation in the crop. In the first year of the experiment, tests were conducted on the uptake of fission products by wheat and peas. In order to study the aftereffects of lime and organic matter on plant uptake of fission products, tests were conducted for the second and third years with the same amended soil used in the first-year tests. The wheat and pea plants, however, were replaced by vetch and oats in the second year, and maize in the third. Results showed that in general, the liming of the soil and its enrichment with organic matter may reduce plant uptake of fission products to a certain extent. The accumulation of fission products is reduced by the action of lime and organic matter to a greater extent in leguminous plants, especially peas and vetch, than in cereals (wheat and oats). Other experimental conditions being equal, the quantities of radioisotopes taken up by the above ground organs of wheat and oats are smaller than those taken up by the above ground organs of leguminous plants. Lime and organic matter also substantially reduced the uptake of fission products by both the vegetative and reproductive organs of maize. Strontium, cerium, and ruthenium were the radioisotopes used in the study. [Tech. 3½ pp. 5 tab.]

Hartman, Roland C.

470. Composting Controls Flies. *Pacific Poultryman*, 69:2:18, February 1963.

Describes the manure composting operations at a poultry ranch in San Marcos, Calif. The composting program is believed to be the reason for the almost complete absence of flies. From 70 to 75 percent of the composting is done while the manure is still under the cages. The most important feature of this stage of the process is the 6-inch high pad of manure which is left under the cages after the top layers of manure have been removed. This pad contains the bacteria that are responsible for composting. When the manure is removed from below the cages, it is spread out to a depth of 3 to 4 feet and sprinkled with water. The final step of the process involves maturation in windrows, with twice-weekly turnings. Sale of the compost returns enough to cover the complete costs of processing the manure, and the estimated $60,000 to $70,000 annual cost of a manure cleanout program is eliminated. (See item No. 471.) [Det. 3 pp. 4 ill.]

471. Composting Controls Flies (and Saves Money) at Poultry Ranch. *Compost Science*, 4:1:26, Spring 1963.

Reprint. (See item No. 470.) [Det. 3 pp. 4 ill.]

Hartstonge, D.

472. Municipal Composting. Experiments at Levin. *Compost Journal*, 21:1:18, February–March 1962.

A local resident in Levin, New Zealand, is experimenting with the composting of borough refuse. Council employees deliver the refuse to a site supplied by the council. After the waste has been watered, mixed, and piled up, it is covered with long grass over which a layer of 6 inches of sawdust is spread. The experimental heap is 20 feet wide, 4 feet high, and 80 feet long. If the experiment proves successful, the resident intends to build three parallel walls 5 or 6 feet high and wide enough to allow a truck to empty its refuse load. [News. ½ p.]

Hilkenbaumer, F.

473. Experience in the Use of Compost in Orchards. *Compost Science*, 3:2:18, Summer 1962.

Applying garbage-sludge compost in German fruit orchards increased harvests. The results were particularly good during the drought year, 1959. Trees grown in sandy soils benefited the most. [Det. 1½ pp. 1 ill.]

Horstmann, O.

474. Technical and Practical Results and Developments in Refuse Processing and Composting. *International Research Group on Refuse Disposal Information Bulletin No. 14*, p. 15. April 1962.

Discusses six topics related to the operation of a refuse processing and composting installation: hygienic requirements; refuse quantities of different composition; seasonal and yearly variations; distribution problems and selling prices; financial problems; and future composting developments. [Gen. 7½ pp.]

Hutchinson, G. A.

475. Auckland Adopts Municipal Composting. *Compost Journal*, 21:1:19, February–March 1962.

The Auckland, New Zealand, city council has been experimenting for the last 12 years with a one-man pilot composting plant, erected expressly for the purpose of determining facts about municipal composting. Now the city council has decided to proceed with erection of a 100-ton-per-day Dano biostabilizer composting plant, which will be the first full size mechanized composting plant in New Zealand. The article describes: the pilot plant; results from the pilot plant study (physical characteristics and chemical composition of raw refuse and finished compost); the overseas investigation of composting plants comparable to the proposed Dano plant; the refuse disposal situation in Auckland; the several disposal alternatives open to the city; reasons for adopting the alternative of 67 percent composting, seven percent incineration, and 26 percent tipping; and the 100-ton-per-day Dano installation. [Det. 4¾ pp. 2 tab.]

476. Auckland's Municipal Compost Plant in Operation. *Compost Journal*, 22:5:19, October–November 1963.

Construction work has been completed on New Zealand's first fully automatic composting plant in Auckland. The article gives a complete description of the composting plant. Equipment in the plant includes: two steel, 60-cubic-yard reception hoppers with slow moving apron feeders and heavy traverse breaker beams to spread the refuse evenly and tear open parcels of refuse; two conveyor belts with magnetic head pulleys for removal of ferrous material; two 310-cubic-yard Dano biostabilizers; screening chambers consisting of perforated continuations of the biostabilizer shells; additional screening units, each consisting of a two-deck shaker screen with three-inch top cloth and ½-inch lower cloth; a Buhler double-rotor hammermill; and a double-roll dense particle separator. Refuse is fermented for a remarkably short period of 5 days. After the partially matured compost completes the mechanical part of the process, it is stacked in windrows for an additional 4 to 5 weeks. The compost will be sold at three differing grades of maturity and accordingly of price. [Det. 3½ pp. 3 ill.]

477. Why This New Zealand City Chose Composting. *Compost Science*, 3:4:24, Winter 1963.

In 1960 it was found necessary, because of a shortage of landfill space, for the city of Auckland, New Zealand, to institute a pattern of refuse disposal. After investigations of overseas composting plants, experiments with a pilot composting plant, and careful examination of all the various possible disposal methods and combinations of disposal methods available, the city council decided upon a refuse disposal pattern of 67 percent composting, 7 percent incineration, and 26 percent tipping. The article gives details of the deliberations leading up to the decision on this disposal pattern, of the various alternative methods available, and describes the pilot composting plant and the main composting installation required by the plan. [Det. 5½ pp. 1 ill. 1 diag. 2 tab.]

Kaibuchi, Yonosuke

478. Research on Refuse and Garbage Composting in Kobe City, Japan. *Compost Science*, 3:1:15, Spring 1962.

Condensed from a paper, "Research on Composting of City Refuse and Nightsoil," which appeared in the November 1961 issue of the American Society of Civil Engineers' *Journal of the Sanitary Division*. Describes the experiences of Kobe City, Japan, in aerobic composting of municipal refuse and nightsoil. A small-scale pilot plant was established for the purpose of collecting data to operate a larger plant in the future. The proto-type plant, through the primary digester, was completed in August 1956. In March 1957, the curing bin and piping for adding raw nightsoil and anaerobically digested nightsoil sludge to the ground garbage were completed. The article describes the plant equipment—feeder, conveyor for segregation, grinder, storage bin and table feeder, primary mechanical digester, blower, belt conveyors, and curing bin. Also describes several obstacles encountered with grinding equipment, the storage bin and table feeder, and the digester. Lists the five major points of revision in the plant and gives the fertilizer value of the composted refuse. [Tech. 5 pp. 1 ill. 1 diag. 4 tab. 1 graph. 7 ref.]

Keilling, J.

479. Contribution to the Investigation of Soil Biology. *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 21. December 1962.

A report on results obtained from measuring the basic phosphatase in soils and organic fertilizers. Part A gives the content of basic phosphatase, carbon, nitrogen, and microbial population in humus fertilizer. No relationship between nitrogen content and enzyme activity or the number of microorganisms was found. Part B gives the content of basic phosphatase, nitrogen, and carbon in French and African soils and at different depths of these soils. The values for African soils fell, in general, under similar French results. The examination of deeper soil layers gave a strong deviation of results from different localities. Discussion follows the report. [Det. 5 pp. 5 tab.]

Keller, Peter

480. Analysis and Evaluation of Solid Waste With Regard to Composting. *Compost Science*, 3:2:7, Summer 1962.

From the consumer's point of view, there are two criteria for the evaluation of the quality of a compost—the chemical composition and the physical composition of the compost. Chemical composition of a compost—its content of organic substances, nutrients, trace elements, and substances harmful to plants—depends exclusively upon the chemical composition of the original material. The physical quality of a compost—its structure and appearance—is essentially dependent upon the composting method. As compost is used more and more in intensive cultivation, the requirements with respect to its structure and absence of foreign materials are also increasing. A compost will be better as its content in humiferous substances is higher. In addition to organic substances, a compost contains various amounts of nutrients and trace elements essential to plants. [Gen. 1 p.]

Kennerly, A. B.
481. Let's Start Saving Cotton Gin Trash. *Compost Science*, 2:4:26, Winter 1962.

Mechanical harvesting and hand snapping of cotton have been responsible for the tremendous increase in cotton gin wastes piling up at the gins. In Texas alone 2.5 million tons of gin trash are produced each year. Most ginners have incinerated these wastes, but more and more these days cotton gin wastes are being recognized as a good source of composting material and as a producer of increased crop yields. In plant food value, a ton of cotton bur compost carries 30 pounds of nitrogen, 7.9 pounds of phosphorus, and 101 pounds of potash with a formula of 1.5–0.4–5. This compares favorably with barnyard manure, exposed to the air for 1 year, which carries 10 pounds of nitrogen, 6 pounds of phosphorus, and 8 pounds of potash for a formula of 0.5–0.3–0.4. Research has shown that it pays to spread the cotton burs back on the cotton land which increases lint yields by an average of 27 pounds per acre. [Det. 2 pp. 5 ill.]

Kick, H.
482. Reclamation of Surface Mining Land. *Compost Science*, 3:2:21, Summer 1962.

Results obtained to date from German experiments, among others, show that garbage composts, garbage-sludge composts, and sewage-sludge composts can be utilized for soil amelioration purposes, provided the cost of transportation and distribution of the material can be kept within acceptable limits. This means that areas destroyed by surface mining may be reclaimed for agricultural and forestry purposes. Estimates that the Rhineland coal workings should be supplied annually with 300 tons per hectare of garbage compost, or an amount equivalent to that produced by approximately 450,000 people per year. Discusses transportation of the compost to the reclamation area, which is the main problem involved in the operation. [Gen. 1 p. 1 ill.]

Keiss, Ing. F.
483. Combined Sludge-Garbage Composting. *Compost Science*, 3:2:13, Summer 1962.

Briefly surveys methods of sludge pretreatment for subsequent composting with garbage. If equal quantities of unreduced garbage and putrefied sludge are to be mixed, experience has shown that mechanically treated putrefied sludge should be thickened to an 84-percent water content before it is mixed with the garbage. If the sludge comes from a mechanical-biological putrification plant, water content must be reduced to 78 percent, which is no longer possible by thickening alone. If the garbage is previously reduced to smaller particles, the putrefied sludge from a mechanical-biological putrification plant must be drained down to a 70-percent water content. From the agricuitural point of view, sludge should be drained wtihout addition of harmful precipitation agents and before composting. The Starconsa procedure, drying beds, and Precoat filters are the methods liable to be used. [Gen. ½ p.]

Kupchik, George J.
484. Economics of Composting Municipal Refuse. *Proceeding of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 89:SA1:91, January 1963.

Discussion of the article entitled, "Economics of Composting Municipal Refuse," by Hillel I. Shuval. (See item No. 520.) The author, who has recently served as an advisor to study the possibility of municipal refuse composting in Bogota, Colombia, finds difficulties in parts of Mr. Shuval's analysis. Contends that unit costs should not be based on volume of compost, but on a weight basis, because volumes vary considerably depending upon the degree of compaction. Mr. Shuval's table on unit costs and revenue is revised by considering the unit costs per ton of compost rather than per cubic meter, with values in United States dollars. The study in Bogota indicated that under existing conditions composting is not an economical method for disposing of the city's wastes. Perhaps where incineration is the only alternative, composting may be economically feasible; but in Bogota, landfill sites are easily available. [Det. 3 pp. 1 tab.]

Langewiesche, Wolfgang; and Land, Elizabeth
485. Good Soil From Old Garbage. *Reader's Digest*. 81:486:132, October 1962.

Describes the founding of a compost company in Norman, Okla., and the Naturizer process which is used at its composting plant, all in the context of other composting developments in this country and abroad. The other composting installations mentioned include those in San Fernando and Sacramento, Calif. [Gen. 4⅓ pp.]

Lenhard, G.
486. Methods for the Evaluation of Composts. *Compost Science*, 4:1:20, Spring 1963.

Presents methods for evaluating the effects of composts on crop production and soil fertility and preservation. Compost must be assessed for both its direct and indirect effects. The direct effects of compost on crop production are due to the chemical nutrients which it supplies; the indirect effects are produced by the physical condition of the soil and compost. Describes: (1) the physical methods for compost evaluation—the base exchange capacity, humic acid determination, anionic adsorption capacity; (2) the chemical extraction methods; (3) the dehydrogenase activity method; (4) standardization for the determination of biochemical activities;

and (5) standardization of the dehydrogenase method for the determination of mineral nutrient deficiencies in composts and compost-soil mixtures. [Tech. 6 pp. 1 tab. 2 gr.]

Lindstrom, Rikard

487. A Simple Process for Composting Small Quantities of Community Wastes. *International Research Group on Refuse Disposal Information Bulletin No. 18*, p. 5, August 1963.

Gives a complete description of an experimentally tested, small-scale composting unit, which is capable of converting refuse and sewage into a stable compost through aerobic decomposition. The unit consists of an underground tank of impervious material such as concrete or plastic divided by vertical partitions into two or more chambers. The upper chamber serves as a receptacle for the feces, the middle chamber holds kitchen and garden refuse, and the lowest chamber serves as storage for the finished compost. The chambers are connected through ventilation holes and to the outside air through screened air vents and a vent pipe. The partitions do not reach the bottom of the tank, but leave open flow passages so that, with the slope of the bottom, a suitable downward movement of wastes occurs. The entire composting operation is done without mechanism or the addition of chemicals or water. This arrangement can be built in small or large units connected directly to the house or building from which the wastes originate. It is primarily used in areas where no sewage treatment plant is available, where leaking sewers exist that contaminate the soil, or where transportation and disposal of wastes pose practical or economic problems. [Det. 6 pp. 2 diag. 2 dra.]

Liss, G. O.

488. Practical Composting at the Nursery. *Compost Journal*, 22:5:16, October–November 1963.

Contends that composting at the nursery is well worthwhile. The life of the soil must be maintained, and nature sees to this by humus developing activities, such as fungi, bacteria, and worms. But it must be the grower's task to assist these natural, organic processes. Semidecomposed compost is of little use; the more the finished compost resembles in consistency, smell, and appearance the crumbly, brownish-blackish, aromatic woodland soil, the better the compost. Anything and everything may be composted: weeds, tomato haulm, chrysanthemum stems, leaves, residue from brassica, and lettuce crops. The material is built into heaps, and in 4 to 6 months the heaps are turned twice, if possible. In the author's experiences, compost prepared chiefly from tomato haulm was returned for the next season's tomato crop with excellent results. Compost was also used in varying proportions in all the mixtures for pots, boxes, soil blocks, tomato seedlings, and chrysanthemum cuttings. [Gen. 1 p.]

489. Practical Composting at the Nursery. *Compost Journal*, 22:6:7, December 1963–January 1964.

Relates some experiences with composting at a nursery. Regards compost principally as an agent bringing new life into the soil, and secondly as a source of soil nutrients. There is no doubt that microorganisms in the soil, particularly fungi, thrive on compost and establish and maintain balanced conditions in the soil which make for healthy and balanced growth. In the author's composting practices, heaps were 5 to 6 feet wide at the base and 5 feet high. They were built in alternate layers of crop residues and farmyard manure in the proportion of 4 or 5 to 1. All heaps were turned at least once, and sometimes twice. [Gen. 1 p.]

Livshutz, Alex

490. New Developments in Windrow Composting. *Compost Science*, 3:3:26, Autumn 1962.

Offers suggestions for improving the windrow method of refuse composting. Includes forced aeration methods and equipment, the covering of windrows with plastic sheets, and the preparation of materials to be composted. Dr. John R. Snell made a big advancement in windrow composting by introducing forced aeration, which reduces the number of windrow turnings to two or three. Describes the forced aeration method and equipment involved, and lists nine advantages of this practice. Turning of windrows may be altogether eliminated by covering them with plastic sheets. Gives the advantages of this practice, also. In order to insure successful composting, the refuse should have the optimum carbon-nitrogen ratio, pH range, and moisture, and should be precomposted. Describes the precomposting process, optimum pH range, carbon-nitrogen ratio, and moisture content, and lists eight advantages of precomposting. [Det. 3 pp. 1 diag.]

Meechin, Jack D.

491. Building a Compost Stack. *Compost Journal*, 21:5:12, October–November 1962.

Describes how to build a compost stack, including site selection, ingredients, the various layers to construct in the building-up process, and framework (bin) for the compost stack. A variety of ingredients should be used, too much of one kind of matter does not make a balanced product. These wastes should be included: all kitchen waste; contents of the vacuum cleaner; all garden waste; and animal wastes or seaweed, if available. It is preferable to build the heap directly on the surface of the soil and the area should be lightly dug over. The stack should contain a 6-inch layer of course materials, a 4-to-6-inch layer of vegetable wastes, a layer of animal manure, and a light dressing of soil. After completion, the stack should be covered over with old sacks, straw, or carpeting to keep in the heat. Gives a sketch of one kind of adjustable compost bin. [Gen. 2 pp. 1 dr.]

492. Hints on Making Compost. *Compost Journal*, 22:6:24, December 1963–January 1964.

One of the pitfalls of the beginner is the mistake of making the compost stack too large. The stack will heat up better and break down faster if the size is kept smaller, preferably 3 feet by 3 feet. This size stack can be built in less than a day, and will be working well within 48 hours. Within a week the stack will have shrunk so that any remaining material can be added. Quicker breakdown of material can be achieved by the use of a chopping board to chop up material before it is added to the stack. Carrots and parsnips that are bolting to seed, partially broken down straw or hay, blood, and bone manure included in the stack will give pleasing results. It is a good idea to mature the completed stacks by covering them with black polythene. [Gen. 1¼ pp.]

493. Municipal Composting in Japan. *Compost Journal*, 22:2:22, April–May 1963.

There are 15 composting plants operating in Japan and 6 more under construction; among them are 12 Dano plants. A total of 1,804 tons of compost was sold in Japan in 1961: 750 tons for lawns, 664 for tobacco growing, 123 for fruit trees, 94 for beets, 67 for afforestation, 18 for flower growing, 79 for vegetable growing, and 9 for other purposes. Compost revenue was 2,682,650 yen and sales of salvaged iron scrap totaled 214,535 yen. Further figures on refuse disposal costs in Hemeji City, Japan, show that composting is the most economical method of disposal of city wastes. [News. 1 p.]

494. The Tollemache System. *Compost Journal*, 22:1:19, February–March 1963.

Briefly discusses certain aspects of the Tollemache composting system. The aim of the method is to obtain quick breakdown, strictly along the lines of nature, with no use of mechanical methods to break down the wastes. A temperature of 110° to 120° F. is maintained. Initial breakdown is by the thermophilic bacteria. With controlled temperatures as much breakdown can be gained in 2 days as would be gained by stockpiling for 3 weeks. Activated compost (materials in the process of breaking down) may be used as a "starter" for new batches of material, but matured compost is useless if put back to hasten the starting process. Under the Tollemache system, wastes can be transformed into compost in 8 to 10 days. [Gen. ½ p.]

Menzel, Ronald G.

495. Radioisotopes in Soils: Effects of Amendments on Availability. *Compost Science*, 2:4:3, Winter 1962.

There are two kinds or radioisotopes presently in soils—natural and artificial. Although the content of the natural radioisotopes in soils is considerably higher than that of the artificial radioisotopes (or fission products), their uptake by plants has not caused concern for human health. There has been, however, great concern about the presence of fission products in agricultural land and materials used for food. This article discusses the possibilities of minimizing the uptake of fission products by plants through the application of soil amendments. The concept of availability of an atom to a plant is first considered, followed by ways in which amendments might influence availability. Soil amendments considered include lime, gypsum, mineral fertilizers, and organic materials. Because of its greater availability to plants and retention in animals, more attention is given to the effect of the amendments on availability of strontium 90. Organic material added to soils in amounts of several tons per acre can affect mineral uptake in several ways—by increasing microbial activity, changing the composition and amount of soil air, improving the cation exchange capacity, and by altering the composition of the soil solution. Effects of organic matter on uptake of fission products may thus be quite large. However, as yet the effects have not been investigated very thoroughly. (See item No. 512.) [Tech. 5 pp. 4 ill. 3 tab. 26 ref.]

Mercer, Walter A.

496. Composting Fruit and Vegetable Refuse—Part I. Investigation of Composting as a Means for Disposal of Fruit Waste Solids. Washington, D.C.: National Canners Association Research Foundation, May 1962. 37 pp.

Serious current and potential problems arising from the disposal of fruit and vegetable waste solids emphasize the need for research to develop acceptable and economically feasible methods for handling this type of refuse. This is a progress report of pilot scale composting studies using solid waste materials from the canning of fruits conducted during the 1961 canning season by the National Canners Association Western Research Laboratory. Includes descriptions of: the aerobic composting process; objectives of the long-range research; specific aims of the first year program; methods of procedure used in the composting experiments; methods of laboratory analysis; results from five experiments; and a discussion and summary of the results. [Tech. 37 pp. 2 diag. 12 gr. 6 tab.]

Mercer, Walter A.; Chapman, Jay E.; Rose, Walter W.; Katsuyama, Allen; and Dwinnell, Frank, Jr.

497. Aerobic Composting of Vegetable and Fruit Wastes. *Compost Science*, 3:3:9, Autumn 1962.

Serious current and potential problems arising from the disposal of fruit and vegetable waste solids emphasize the need for research into acceptable and economically feasible methods for handling this type of refuse. The article describes experiments conducted by the Research Laboratories of the National Canners Association into the disposal of fruit and vegetable wastes by aerobic composting. Includes: what is involved in the composting process; objectives of the long-range research; specific aims of the first year program; methods of procedure of the pilot-scale composting studies carried out during the 1961 canning season; methods of laboratory analysis; results of the five experiments; discussion of results; and a summary of the results. The outcome of these preliminary investigations indicates that composting does offer a feasible and esthetically acceptable method for the disposal of high-moisture wastes, such as fruit and vegetable solids. [Tech. 11 pp. 10 ill. 2 diag. 10 tab. 12 gr. 8 ref.]

Midgley, A. R.

498. WHEY AND WOOD BARK WASTES MAKE FERTILE COMPOST. *Compost Science*, 4:1:29, Spring 1963.

A report discussing the advantages of putting together two problem byproducts—liquid whey from cheese production and bark from wood and pulp production—to make a usable product. Describes: (1) Whey chemistry and characteristics; (2) feed and fertilizer value of whey: (3) fertility value of whey; (4) wood bark properties and characteristics; (5) bark disposal; (6) whey and bark characteristics when used together; and (7) experimental methods and results using whey and bark. [Det. 3 pp. 3 ill. 2 tab.]

Muir, Joe

499. MANURE PAYS OFF FOR CALIFORNIA RANCHER. *Compost Science*, 2:4:28, Winter 1962.

Bagging and selling 9,000 tons of composted manure annually brings gross income of some $27,000 to the McDougal ranch at Collinsville, Calif. Other manure is sold by the truck load and also spread on their own land. Article includes other cost data concerning the operation. [Det. 3 pp. 1 ill.]

Naik, B. N.; Badhe, N. N.; and Ballal, D. K.

500. FERTILIZING VALUE OF OILED AND DEOILED CAKES. *Compost Science*, 3:2:33, Summer 1962.

Originally appeared in the *Journal of the Indian Society of Soil Science*. Rapid decomposition of organic matter in tropical soils, has made them proverbially poor in nitrogen. Oil cakes (in India) are valuable organic, nitrogenous manures. The real value of nitrogenous manure is judged by the rate at which the nitrogen becomes available to the crop, generally in the form of nitrates. It is possible that the rate of nitrification of oil cakes may be affected by the residual oil content. The article describes experiments undertaken to study the nitrifiability of different cakes and the effect of the deviling of these cakes. Includes: a review of literature on the subject; procedures used in the experiment; and results—ammonification, nitrification, and effect of oil on nitrification. The nitrification of five cakes (Groundnut, Safflower, Castor, Karanj, and Til cakes), both oiled and deoiled, was studied. Karanj cake nitrifies most, followed by Til cake, Groundnut and Castor cakes, and Safflower cake. [Det. 2 pp. 2 tab. 9 ref.]

Niese, G.

501. EXPERIMENTS TO DETERMINE THE DEGREE OF DECOMPOSTION OF REFUSE COMPOST BY ITS SELF-HEATING CAPABILITY. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 1. May 1963.

Describes experiments conducted to determine the effects of decomposition on the self-heating capability of refuse and refuse compost. The influence of continuing decomposition on self-heating capability was examined under constant laboratory conditions. Many samples of refuse and refuse compost were available as experimental material. The self-heating capability of refuse and sewage sludge mixtures stored under various environmental conditions was studied. The self-heating experiments were conducted in Dewar flasks which were stored in an incubator. Temperature differential between the flask contents and the incubator was automatically minimized. Experiments were also conducted on the necessity for automatic regulation of temperature differences. The report gives procedures used in the experiments and results obtained, including heat loss in self-heating, self-heating capability of various refuse and refuse compost samples, and microbial counts and self-heating capability. [Det. 17½ pp. 3 tab. 9 gr. 11 ref.]

Oesterle, P.; Rohde, G.; and Rudat, K. D.

502. BERLIN STUDIES SHOW EFFICIENCY OF COMPOSTING. *Compost Science*, 4:3:19, Autumn 1963.

Discusses the following: decomposition of urban wastes; the value of molds in the composting process; composting stable manure with sawdust; composting market and factory wastes; and composting experiences in Berlin, Germany. Emphasis is placed upon the hygienic aspects of urban waste composting. [Det. 4 pp. 1 ill. 3 ref.]

Olds, Jerome

503. THE LITERARY WORLD OF COMPOSTING. *Compost Science*, 3:1:34, Spring 1962.

Reviews three new books on municipal composting: *Town Waste Put to Use*, a symposium edited by Paul Wix; *Waste Treatment*, edited by Peter C. G. Isaac; and *Municipal Composting*, by A. G. Davies. [News. 2 pp. 1 diag.]

Ospelt, Ernst

504. REFUSE COMPOST—A PRODUCT OF THE WERDENBERG-LIECHTENSTEIN COOPERATIVE PLANT. *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 19. December 1962.

Construction of the cooperative composting plant in Buchs, Switzerland, was planned with the thought that refuse could and should be converted into a product which can be returned to the soil as humus. The refuse-sludge compost produced at the plant is comparable to very good stable manure in regard to content and effect. The article describes some of the areas in which the compost can be utilized. Included among them are gardening, wine-growing, and forestry. [Gen. 1½ pp.]

Pain, A. K.

505. EFFECT OF COMPOST ON NUTRIENT QUALITY OF FOOD. *Compost Science*, 3:1:40, Spring 1962.

Originally appeared in the *Journal of The Indian Society of Soil Science*. Describes an investigation to determine the relative efficiency of nitrogen in an organic manurelike mulberry compost and in farmyard manure (from cattle shed) on the yield of mulberry leaves, its food value, and formation of cocoons. Includes: the composting of the material; chemical analysis of the mulberry compost and farmyard manure; procedures used in the experiment; results obtained; and discussion. It was found that compost manure prepared from the refuses of mulberry fields and rearing houses had almost similar chemical composition and manurial value as farmyard manure mulberry fields manured with mulberry compost showed significant increase in leaf yield and food value over control plots and almost similar effects as observed with farmyard manure. Effects of the leaves produced by the treatment of compost and farmyard manure on the formation of cocoons and quality of silk were almost similar and both were far superior to the leaves from unmanured plots. [Det. 2 pp. 5 tab. 5 ref.]

Parrakova, Edita

506. Hygenic Criteria for the Evaluation of Refuse Compost. *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 10. December 1962.

Because refuse is an excellent medium in which pathogenic microorganisms survive and a breeding ground and attractant to various insects and rodents, it is necessary to consider certain technical requirements in the processing of refuse to compost. Several criteria for the evaluation of compost from a hygienic standpoint have been developed, using chemical and biological indicators. The content of ammonia has been used as a hygienic indicator, the higher concentrations indicating undesirable processes in the decomposition of composting material and its presence acting as an insect attractant. Definite emphasis is placed upon microbiological methods in the biological analysis. Determination of the coli titer; titration for clostridium perfringens; counts of mesophilic bacteria, mold fungi, and Actinomycetes; and titration of nitrifying micro-organisms should be conducted. [Gen. 1½ pp.]

Peyer, E.

507. Erosion Damage in Viniculture and Preventive Measures. *International Research Group on Refuse Disposal Information Bulletin No. 15*, p. 21. August 1962.

Discusses erosion in viniculture and preventive measures which can be taken to reduce the erosion. Includes: reasons why viniculture is more exposed to the dangers of erosion than is any other form of agriculture; the adverse effects of erosion on vineyards; measures against erosion damage—protective construction, sodding, grass stripping, green manuring, and covering with humus, with emphasis upon the last measure; and important sources of humus; preparation of compost in private vineyards; and influence of soil cultivation on erosion. [Det. 10½ pp. 1 ill. 1 tab. 1 gr.]

Rao, S. N.; and Block, S. S.

508. Experiments in Small-Scale Composting. *Compost Science*, 3:4:14, Winter 1963.

Research workers interested in studying composting for application in sanitary waste disposal or for mushroom production, have realized the need for small-scale composting. Large composting machines limit the experimenter to few treatments and a highly variable process. Small-scale units permit many treatments, each adequately replicated, and a uniform, reproducible composting system. The article describes an experiment in which various materials were successfully composted in small-scale units. Four composting units were used—1-, 2-, and 5-cubic-foot indoor units, and one outdoor composter. The units hardware cloth cylinders rested in larger cylinders of the same type, with sawdust insulation in the space between. The material composted included garbage, sewage sludge, sawdust, newspaper, straw, and bagasse. A few of the conclusions reached are: The smaller the amount of material treated, the more necessary it is to supply heat to replace the dissipated heat of fermentation; a moist atmosphere is desirable to prevent the compost from drying out; atmospheric heat assists in the composting but does not completely replace the microbial heat, in that the latter produces a physically different product; to retain the heat of fermentation but allow adequate aeration for the aerobic process, a layer of sawdust surrounding the compost is most satisfactory; the larger composters produce compost more quickly and the compost from these units are more finished than in the smaller units; and an outdoor composter, insulated with sawdust, is even more rapid, and appears to have many advantages over the normal outdoor composting heap. [Tech. 7 pp. 2 ill. 1 diag. 6 tab. 1 gr. 12 ref.]

Rigg, Kenneth

509. Cannery Waste—A Gardener's Viewpoint. *Compost Science*, 3:2:43, Summer 1962.

This gardener has found that cannery waste is a valuable source of fertilizing material, and that it accomplishes the same end as manure but at a minimum outlay. The article describes the gardener's experiences with using cannery wastes. The gardener pays $2 per 2-ton load to have the waste trucked in from a nearby cannery. The waste is applied by a wheelbarrow and shovel method in the fall, with plans to use the ground the following spring, for the fresh material must be given time to decompose. Cannery waste makes an ideal substitute for manure in the compost heap because of its readily available nitrogen. The material to be composted should consist of one part each of ground straw, ground leaves, and cannery waste. [Det. 2 pp. 2 ill. 2 tab.]

Rodale, Robert

510. The Intriguing History of Composting. *Compost Science*, 3:3:30, Autumn 1962.

Tells of a man who was purporting the compost heap method of converting organic farm wastes to "manure" in the United States over 120 years ago. George Bommer was more aware of the problem of preserving soil fertility than are many farmers today. At a time when America still had millions of acres of untapped virgin farmland, he was pointing out that cattle manure could not do the whole job of maintaining soil fertility and that the way to farm efficiently was to use all the stalks of certain crops to make manure by a method he devised. Bommer's ideas and directions for employing his method were set down in his book "The Bommer Method of Making Manure." The article quotes a part of the preface of this book and a letter written by a New York farmer who uses Bommer's method, and describes in detail procedures and materials used in the method. Also quotes some paragraphs from an article by John Young, Esq., concerning rules for forming composts, which appeared in the August 5, 1825, issue of "The New England Farmer." [Gen. 4 pp. 3 dr.]

Ruckstuhl, E.
511. Cooperative Composting. *Public Cleansing*, 52:4:156, April 1962.

A description of the composting plant serving a 100,000 population and built under an agreement by ten municipalities in the Zurich, Switzerland, area. The plant, which uses the SMG-Multibacto process, features a patented crushing device that pulverizes the hardest of refuse and transforms all waste into compostable material without any of it being left over to dump or incinerate. There is absolutely no pollution of neighboring air by odor, dust, or smoke, and the plant is operated and maintained by only one supervisor and two assistants. [Gen. 2 pp.]

Schatz, Albert
512. Concerning Radioisotopes in Soils. *Compost Science*, 2:4:8, Winter 1962.

Briefly discusses Dr. Menzel's article, "Radioisotopes in Soils: Effects of Amendments on Availability." (See item No. 495.) Encourages more study in these areas: (1) Chelating agents. The whole area of chelation is a major mechanism in the origin, formation, and fertility of soils. (2) The relative affinities of complexing agents for strontium 90 and other fission products in the soil. (3) The extent to which plant uptake of radioisotopes may be mediated via a direct humus effect. (4) Competition for radioisotopes between higher plants and soil microorganisms. (5) The extent to which strontium can replace calcium in soil microbiota in pure culture. (6) The extent to which strontium can replace calcium in higher plants. [Gen. ½ p.]

Schroder, W.
513. Dewatering and Drying as a Prerequisite To Composting of Sewage Sludge. *International Research Group on Refuse Disposal Information Bulletin No. 14*, p. 23, April 1962.

Reviews methods for dewatering and total drying of sewage sludge preliminary to mixing with refuse, in the combined disposal of these wastes by composting. Processes which are good only for preliminary dewatering of sludge include sludge sieves, sludge centrifuges, and sludge filters (vacuum and pressure filters). Two processes which require preliminary dewatering but which render additional treatment unnecessary are the Fige process and the pressure-drying process. With the exception of the last two processes, all of these procedures reduce moisture content to about 70 percent: the sludge paste obtained contains too much water for transportation or utilization. A drier product, containing about 30- to 35-percent moisture, can be obtained by use of a heat drying process. The main types of heat drying installations are rotary drum dryers, honeycombed band dryers, selective dryers, stage dryers, and belt dryers. The article describes all of these dewatering and drying processes, and the cost of sludge dewatering and heat drying. Discussion follows the report. [Det. 20½ pp. 5 ill. 5 diag.]

Schulze, K. L.
514. Automatic Temperature and Air Control in Composting. *Compost Science*, 2:4:31, Winter 1962.

Describes the theory upon which an automatic temperature control device for enclosed composting would operate and composting experiments conducted using such a device. Includes descriptions of the composting unit, the raw material used for the experiment, and results (data on temperatures, air flow, moisture, nitrogen content, and composted refuse). In general the experiments proved that a very accurate and reliable automatic temperature and air control is obtained by using the combination of thermostat and solenoid valve. This type of automatic process may have great practical value, especially if it is combined with an oxygen analyzer which would control the residual oxygen in the exhaust gas. [Tech. 4 pp. 1 ill. 1 diag. 4 tab. 3 gr. 4 ref.]

515. Continuous Thermophilic Composting. *Applied Microbiology*, 10:2:108, March 1962.

Describes composting experiments conducted at Michigan State University in which attempt was made to maintain aerobic decomposition of organic waste materials in the thermophilic phase (that is, in the range of 120° to 160° F.) throughout the composting process. Describes the equipment used, materials composted, methods used in the experiments, results obtained, and observations of the completed product. Operation of the 55-gallon rotating drum pilot plant has shown that under complete mixing conditions it is possible to maintain aerobic decomposition of mixed organic waste materials, such as garbage, sewage sludge, and paper, continuously in the thermophilic phase. This means that the initial or starting phase of the composting process can be eliminated and that the decomposing mass can be maintained at temperatures between 127° and 158° F. as long as the thermophilic process is operated properly. After the initial charge of waste material has reached the thermophilic phase, the process is maintained by the continuous removal of decomposing material. (See item No. 516.) [Tech. 14½ pp. 1 ill. 1 diag. 6 gr. 7 tab. 22 ref.]

516. Continuous Thermophilic Composting. *Compost Science*, 3:1:22, Spring 1962.

Reprint. See item No. 515. [Tech. 12 pp. 1 ill. 1 diag. 6 gr. 7 tab. 21 ref.]

517. Home Composting Units. *Compost Science*, 3:4:5, Winter 1963.

Discusses the onsite, small scale refuse composting unit. One disadvantage of such a disposal system on a broad scale is that a collection and disposal service would still have to be operated by the community for uncompostable material, such as cans, glass, china, plastic, and bulk waste. The main problem involved is that the daily supply of raw material from an average household would not be sufficiently large to maintain thermophilic temperatures in an open pile. Accumulation of refuse to the desired amount would not solve the problem, because during accumulation the raw material would begin to ferment and eventually become sour and septic, causing a health hazard. Composting on a continual basis is the only answer. Such a practice is described in another article by the author, entitled "Continuous Thermophilic Composting." (See items No. 515 and No. 516.) Reviews the results of this experiment, and describes a possible design for the home composting unit. [Det. 3½ pp. 1 ill. 1 diag. 1 ref.]

Schumm, Ruth

518. Peace Corps Composters. *Compost Science*, 4:2:13, Summer 1963.

Tells of the work being done by Peace Corps volunteers in the field of soil science. Focuses upon the work of one volunteer, John C. Kennedy, on the development and utilization of compost in the Philippines. [Gen. 2 pp. 2 ill.]

Seifert, Alwin

519. Compost. London: Faber and Faber, 1962. 124 pp.

A complete composting manual consisting of chapters on the following: the background of composting; the nature and action of compost; making new-style compost; role of compost in farming and gardening; farmyard manure; utilization of farmyard manure-loam mixture; liquid manure; compost for the fruit-grower; compost for vines; compost in the garden; compost and nursery trees; and some approaches to composting (the biodynamic approach, M. E. Bruce's quick compost, the Indore process, and domestic wastes). [Det. 124 pp. 7 ill. 2 dr. 37 ref.]

Shuval, Hillel I.

520. Economics of Composting Municipal Refuse. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 88:SA4:47, July 1962.

Reprinted from *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961. It is felt that the major obstacles to composting in the United States are economical ones rather than technical. The article gives an economic analysis of two Israeli composting plants in order to illustrate the economic feasibility of refuse composting under certain favorable economic conditions. The data presented tend to point out that the composting plants may be in the same cost range as refuse disposal by incineration. The two plants discussed include the 50-ton per day Dano biostabilizer plant in Haifa and the 500-ton per day Dorr-Oliver plant in Tel Aviv. The article examines the existing market for compost in Israel; gives an economic comparison of the two plants, including general background data, production costs and revenue, and unit costs and revenue; and compares composting costs and incineration costs. (See items No. 523, and No. 528.) [Det. 9 pp. 3 tab. 4 ref.]

521. The Economics of Composting Municipal Refuse—Part I. *The APWA Reporter*, 29:2:24, February 1962.

An economic analysis of two composting plants in Israel—a 50-ton-per-day Dano biostabilizer plant in Haifa, and a 500-ton-per-day Dorr-Oliver plant in Tel Aviv. Includes: the Israeli market for compost; construction costs for the plants; labor requirements and costs; and operating costs. (See item No. 522 for part II.) [Det. 1 p.]

522. The Economics of Composting Municipal Refuse—Part II. *The APWA Reporter*, 29:3:16, March 1962.

Continuation of an economic analysis of the two composting plants in Haifa and Tel Aviv, Israel. (See item No. 521 for part I.) Describes the revenue side, including the sale of the finished compost and salvaged items, and municipal subsidies. A table gives the estimated unit production costs and revenue for the two plants. [Det. 1¼ pp. 1 tab.]

523. Municipal Solid-Waste Disposal—Part XI. *The American City*, 77:12:132, December 1962.

Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961. (See item No. 520). [Det 3 pp. 3 tab. 5 ref.]

Spohn, Eberhardt

524. Mulch or Compost? *International Research, Group on Refuse Disposal Information Bulletin No. 18*, p. 22. August 1963.

Discusses the differences between a "mulch-compost" and a "plant-compost." Contends that it is incorrect to evaluate a compost by its ripeness (degree of decomposition) or by its organic content. The evaluation must be based upon what the compost is to be used for. If the compost is to be used on the surface such as in vineyards, it should contain as much organic matter as possible i.e., be as little decomposed as possible). This "mulch-compost" does not come in contact with plant roots, but has the chance to undergo sheet composting. Soil organisms decompose it, and it eventually mixes with the soil. This process is also called mulching. If the compost is to be mixed into the soil and come directly into contact with seeds, it must be ripe. This "plant-compost" must have a pleasant forest soil smell, never be anaerobic, and must not mildew. [Gen. 2 pp. 3 ref.]

Stahlschmidt, V.

525. PLANT-GROWING EXPERIMENTS WITH REFUSE COMPOST IN JAPAN. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 18. May 1963.

Briefly describes plant-growing experiments conducted by Prof. N. Nakamura, Hyogo Agricultural University, Japan, to determine the value of the compost from the biostabilizer plant at Himeji. Finished compost, having an average moisture content of 30 percent and containing 0.6 percent nitrogen, 0.38 percent phosphorus, and 0.55 percent potassium, was applied in quantities of zero, 7.5, and 15 tons per hectare. Plots were planted using two different soils—one with a good humus content, and another which had been treated with chemical fertilizers only. Radishes, lettuce, celery, sugar beets, white cabbage, strawberries, and onions were used in the experiments. Results indicate that refuse compost is equal or superior to stable manure; an addition of 7.5 tons per hectare gives a higher yield than 15 tons; compost application acts favorably on cabbage yield; compost increases yield and sugar content of sugar beets and reduces the content of nitrogen; concentrated application of compost on onions results in an overdose: and the acid effect of the high mineral salt additions is neutralized by compost application in the celery experiment. [Det. 3½ pp. 3 tab.]

Stelmach, Zenobius

526. EFFECT OF ORGANIC MATTER ON SOIL FERTILITY—PART I. *Compost Science*, 3:1:36, Spring 1962.

Reviews scientific literature concerning the decomposition of various organic materials and its effect upon soil fertility. Discusses these items among others: Components of organic matter; effect of the various additives on organic soil; rate of attack and decomposition; nitrogen relationship; influence of humic acid; and manure solutions. (See item No. 527 for part II.) [Det. 4 pp. 2 ill.]

527. EFFECT OF ORGANIC MATTER ON SOIL FERTILITY—PART II. *Compost Science*, 3:2:27, Summer 1962.

Reviews scientific literature concerned with these questions: Are organic materials containing plant nutrients equally good for all soil types? Since these materials are at different stages of decomposition, how do they affect physical soil conditions and the yield of crops? Discusses effects of organic matter on physical properties, effects on chemical properties, exchange capacity, and organic matter. (See item No. 526 for part I.) [Det. 5½ pp. 1 ill. 126 ref.]

Stone, Ralph

528. ECONOMICS OF COMPOSTING MUNICIPAL REFUSE. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 88:SA6:123, November 1962.

Discussion of the paper entitled, "Economics of Composting Municipal Refuse," by Hillel I. Shuval. (See item No. 520.) Talks about the economics of municipal refuse composting in the United States. Because the inorganic fertilizers are reasonable in cost and inexpensive to apply, the economic picture in this country does not favor organic soil conditions. Perhaps a first step toward municipal refuse composting would be for the U.S. Department of Agriculture to undertake a basic study of the practicality of composting throughout the varied farming regions of the United States. The results of extensive experimental station testing would then provide a sound foundation for establishing the value of compost to American agriculture. The next step would be in establishing an incentive program wherein communities help defray part of the costs of composting. It seems possible to adopt the economical sanitary landfilling method to produce compost by proper engineering procedures for aerating, wetting, and screening. [Gen. 1½ pp. 4 ref.]

Sullivan, Richard H.

529. PHOENIX WILL COMPOST ALL MUNICIPAL REFUSE. *Public Works*, 94:3:82, March 1963.

Gives details of the contract agreement between the city of Phoenix, Ariz., and an Arizona firm for the composting of the city's refuse. The contract provides that the company will construct at its own expense three, 300-ton-per-day Dano composting plants in such locations as to reduce hauling distances. The company must dispose of all municipal refuse, both compostable and noncompostable, for which the city will pay $1.25 per ton for the first year and $1.10 thereafter. Arrangements have also been made for the city to receive some of the revenue from the compost marketing. Also includes a brief description of the plant operation. [Gen. 2 pp. 4 ill.]

Surber, E.

530. POSSIBLE USES OF COMPOST IN FORESTRY. *Compost Science*, 3:2:15, Summer 1962.

In the downs and heaths of Holland and northwestern Germany, various types of composts have been used in the last decades for soil amelioration in reforestation. Results show that compost will improve soils and provide a good basis for productive forest stands. The rewards of compost have also been reaped in the cultivation of forestry plants. Intensive cultivation and the subsequent lifting of young plants, removes large amounts of nutrients from the top soil of cultivation areas. In order to maintain a high level of productivity of the tree nurseries, compost with a high organic content is needed. Through the use of compost, it is possible to reduce by at least one year, the time required for growth of forest plants. In addition, the plants are of better quality and show greater vitality. Compost offers further advantages by helping to prevent erosion. Compost sale possibilities on forestry are good: it is estimated that 20,000 to 40,000 cubic meters of compost are needed for forestry in Switzerland alone. [Gen. 2½ pp. 2 ill.]

Synghal, K. N.; and Yadava, L. S.

531. Mechanical Composting. *Environmental Health*, 5:3:289, July 1963.

A general discussion of mechanical composting and the application of this method to the disposal of municipal wastes in India. Gives a list of the various mechanical composting processes adopted in the countries of the world, and divides these processes into three categories. Gives reasons why these mechanical composting processes may not be directly applicable in India, but lists special advantages which can accrue from using this method of waste disposal. Also suggests information which is needed in planning a mechanical composting process in a particular city, and presents this information for the cities of Bombay, Madras, and Nagpur. [Det. 3 pp. 2 tab.]

Teensma, B.

532. Dutch Bulbgrowers Cannot Get Enough Compost. *Public Cleansing*, 52:1:25, January 1962.

Discusses the many different uses made of refuse compost in the Netherlands. Largest consumption is in field crops (35.3 percent of the total marketed compost in 1959), but this proportion is gradually reducing in favor of market gardening (17.9 percent) and parks, gardens, and playgrounds (22.3 percent), because newer compost plants are producing finer and better quality compost which is too costly for the field crops. Flower bulb culture (3.8 percent) is using more and more compost even though conducted only in western Holland. Many farmers mix compost and stable manure (9.1 percent), but this is only in northern Holland. Forestry uses in southern sections are still very important because forest litter is bought by Belgium and compost can replace the forest litter. Only 4 percent of the compost is used on grazing lands because it is not needed to maintain humus in grasslands. Horticulture uses little compost in general, for green manuring and mulching can provide the requirements for soil organic matter. Compost use in poultry raising did not increase in 1959 and comprises 1.9 percent of the total. [Gen. 1½ pp. 1 tab.]

533. New Guidelines for the Composting of Raw Ground Refuse in the Netherlands. *International Research Group on Refuse Disposal Information Bulletin No. 16*, p. 5, December 1962.

In the spring of 1960, the author received reports from a truck-farming area between Rotterdam and The Hague, the Netherlands, indicating adverse effects of compost on lettuce and tomato plants. After careful investigations, it was found that composts, which were prepared according to guidelines issued in 1955, exhibited plant-damaging characteristics; the characteristics of the refuse and compost had changed so much since 1955 that the old guidelines were no longer valid. The article gives the old composting guidelines, describes experiments conducted in 1960–61 at the composting plants in Delft and Sohiedam to determine criteria for new guidelines, and lists these new guidelines. It was observed that definite and easily recognized zones and layers occur in the windrow, 2 to 3 weeks after stacking. Presents a diagram illustrating these zones and gives pertinent data concerning each of the zones. Harmful compost generally exhibits an acid reaction (pH-value under 7.0) and is localized in the windrow. Zones of harmful compost must be turned, while the other zones will produce a very usable compost without turning. It is impossible to determine in advance the number of turnings necessary; when definite harmful zones are visible, they must be turned until the zones disappear. Best results were obtained by turning with a belt conveyor having a hammermill. [Det. 5½ pp. 1 diag.]

Tribe, H. T.

534. Decomposition of Buried Cellulose Film. *Compost Science*, 2:4:38, Winter 1962.

A report on a study of the decomposition of buried cellulose film. Pieces of washed cellophane of 0.5 by 1.0 centimeter were damped in sterile water and placed singly on ⅞-inch cover slips, to which they adhered, and the cover slips were buried vertically in soil. After recovery the microbial material colonizing the cellulose was stained in picronigrosin in lactophenol, and certain isolations of fungi were made from the cellulose. The soil samples in the cover slips were buried were kept at laboratory temperatures, and moisture content fluctuated be- about 40 and 60 percent of moisture-holding capacity. The soils included black fen peat, calcareous loam, loamy sand, weathered chalk, leaf litter under conifers and acid sandy soil, gault clay, sandy loam, sandy loam under grass, and mull under mixed-leaf litter. [Tech. 5 pp. 38 ref.]

Tsiang, Y. S.

535. Compost Program Is Vital to Nationalist China. *Compost Science*, 4:1:11, Spring 1963.

Presents a brief summary of the recent history of, and developments in, composing on the Nationalist Chinese island of Taiwan. There are four composting plants in Taiwan, treating an estimated 130 tons of refuse daily since decomposable materials amount to only about 50 percent of municipal refuse on the island, the annual production of compost from this source is 23,000 tons. During World War II, the Japanese encouraged Taiwan farmers to construct compost shelters for composting wastes on the farm. The farmers are now subsidized for this practice, and it is estimated that more than 3.3 million tons of compost are produced annually on the farms. [Det. 2 pp. 2 ill. 2 tab.]

Valianos, John N.

536. Capacity Being Enlarged. *Compost Science*, 4:1:17, Spring 1963.

The Phoenix, Ariz., composting plant is being enlarged from a capacity of 300 to approximately 500 tons per day with the addition of two new digestors. Brush handling facilities (for cuttings, tree fronds, etc.) are also being installed at a cost of $150,000 to handle this phase of city disposal. The company which owns and operates the Phoenix compost installation has been working diligently with many of the large growers in the area for the introduction and use of the compost. [News. ½ p. 1 ill.]

537. Full-Time Schedule for Phoenix Compost Plant. *Compost Science*, 3:4:9, Winter, 1963.

Describes the Dano composting plant now being used for refuse disposal in Phoenix, Ariz. Heart of the biological processing is two biostabilizers, or rotating drums, each of which is 86 feet long and 10 feet in diameter. As these units rotate, controlled amounts of air and water are added automatically to create an optimum environment for bacteriological decomposition. Organic matter remains in the biostabilizers from 24 to 30 hours until all putrescible matter which produces odors and attracts flies is digested. Unusual pieces of equipment in the plant include the largest natural frequency vibrating feeder ever built, which also serves as a gigantic primary receiving hopper. After an intensive investigation of all possible refuse disposal systems, the city called for bids for construction and operation of a composting plant. Prior to calling for bids, the city determined the quantity and quality of municipal refuse that had to be handled. [Det. 2 pp. 1 ill.]

Van Daalen, M.

538. Four Years of Composting at Hengelo. *Public Cleansing*, 52:5:198, May 1962.

A progress report on the composting plant in Hengelo, the Netherlands, which was first put into operation in March 1958. The plant contains two rasping machines and roll breakers so that it can continue to function when one of the machines is being repaired. Two problems which have been incurred are the low temperature in the building during winter and a shortage of asphalted ground for storing the compost. About 8,500 tons of refuse pass through the plant annually, from which 6,000 tons of compost are produced. There have been no difficulties in the marketing of the finished product. Explains the various responsibilities of the plant foreman. [Gen. 1½ pp.]

von Reppert, R. L.

539. An Economic Method for Dewatering Sewage Sludges and Their Preparation for Spreading as Fertilizer or Soil Conditioner (Dütag-Albert Process). *International Research Group on Refuse Disposal Information Bulletin No. 18*, p. 12, August 1963.

Describes a new process which economically solves the problems of dewatering sludges and of their use in agriculture. By this method, an easily distributed granulated fertilizer or soil conditioner which is suitable for shipment, storage, and machine spreading, can be produced. In the process, sludge from a digestion tank does not need to be flocculated with basic slag, but only dewatered in a centrifuge. Only the centrifuged flow is flocculated, and because of the reduced solids content, less basic slag is necessary. With a rotary filter, operating without an auxiliary filter bed, the filter cake can be removed from the drum by means of scraper cords. The filtrate is clear and can be returned to the influent of the biological plant without hesitation. The solids separated by the dewatering centrifuge can be mixed intensively with the filter cake from the rotary filter and formed into particles. Costs of sludge dewatering are less for municipalities because the filter cake containing phosphoric acid can be sold as a fertilizer or soil conditioner. The article gives a breakdown of the costs involved. [Det. 9 pp. 4 ill. 1 diag. 1 gr.]

Watson, L.

540. Development of Composting in Israel. *Compost Science*, 4:2:11, Summer 1963.

Describes the recent growth in composting plants in Israel. Focuses upon the Dorr-Oliver plant now in operation in Tel Aviv, describing the process by which the refuse is separated and composted. Also briefly discusses quantity and quality of the compost and sale of the finished product. [Gen. 2 pp. 2 ill.]

White, P. E.

541. Composting and the Rotary Bin. *Compost Journal*, 20:6:26, December 1961–January 1962.

Material to be composted must be in the right condition. The material must be dead, the living sap must either be driven out or have its form changed, and moisture and aeration must be of the right degree. The greatest difficulty is in aeration. The rotary bin offers the advantages that the material can be constantly turned and aerated wtih minimum labor and that the material is under control at all times. [Gen. ⅔ p.]

Whitelaw, J. P.

542. Compost—A Review. *Compost Journal*, 22:1:21, February–March 1963.

Defines the word "compost;" describes how to construct a compost heap from garden wastes, animal manure, and soil; and describes what goes on in the decomposition process. Also discusses: when to apply the compost to the soil; and some of the avenues through which compost benefits the soil and vegetation—inorganic matter (mineral particles of sand, clay, and silt), and organic matter (plant and animal residues). (See items No. 543 and No. 544 for continuation.) [Gen. 2½ pp. 10 ref.]

543. Compost—A Review. *Compost Journal*, 22:2:27, April–May 1963.

Continued. (See items No. 542 and No. 544.) Discusses the following: physical properties of the soil; different circumstances which influence the effect of a compost dressing; symptoms of a decline in physical fertility of the soil; chemical properties of the soil; the effect of lime on soil health; and the meaning of soil fertility. [Gen. 2¾ pp. 10 ref.]

544. Compost—A Review. *Compost Journal*, 22:3:15, June–July 1963.

Continued. (See items No. 542 and No. 543.) Discusses: functions of plant roots; nutrient flow in plants; functions of plant leaves; the carbon fixation process; and benefits which should be obtained from the use of compost (benefits in the physical condition of the soil, in the promotion of plant growth, and in the health of the people). [Gen. 3¼ pp. 10 ref.]

Wiley, John S.

545. An Approach to Municipal Composting. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 22, May 1963.

Reprinted from the summer, 1961 issue of *Compost Science*. Discusses very generally the feasibility, public health aspects, and economics of composting. Composting, as a means of refuse disposal, is currently on trial in the United States, but as yet has not been very successful. Practically the entire burden of success or failure of composting has rested upon the private companies who have constructed and operated the compost plants in this country. It is a public responsibility to effect satisfactory waste collection, treatment, and disposal; more of the burden should rest upon local governments. Research has shown the technical feasibility of composting municipal wastes in the United States; the public health aspects of refuse treatment have been shown to be adequately met by composting; and composting seems to be economically competitive with other means of refuse disposal. All of these comments, however, presuppose sound planning, construction, and operation of the compost works. [Gen. 2 pp. 14 ref.]

546. Pathogen Survival in Composting Municipal Wastes. *Journal of the Water Pollution Control Federation*, 34:1:80, January 1962.

Reviews the literature on pathogen survival in the various processes for composting municipal wastes, and expresses opinions on the findings reported in the references. Includes the following: a table giving times and temperatures required for destruction of the various pathogens; pathogen survival tests in the use of compost in the deep litter method of poultry raising, in windrow composting by the van Maanen system, in composting night soil and other materials in stacks, in open pile composting, in the Earp-Thomas system, in the Indore and Calcutta methods of digested sludge-sawdust, in refuse-night soil composting by the Bangalore methods, and in refuse-sludge composting in windrows; studies establishing the reality of the theory that antibiotic activity or antagonistic effect does occur in composting and is as important as time-temperature in eliminating pathogens; and determination of the antagonistic physical and microbial processes prevailing in composting. [Det. 10½ pp. 10 gr. 2 tab. 23 ref.]

547. Refuse and Refuse-Sludge Composting. *Journal of the Boston Society of Civil Engineers*, 49:1:13, January 1962.

Presents some of the results of composting studies at the Communicable Disease Center in Savannah, Ga., and at a Public Health Service field station in Chandler, Ariz. These studies, along with studies at the University of California and Michigan State University, have shown that composting of organic wastes is technically feasible in either mechanical units or windrows. Also describes two composting processes widely used in Europe—the Dano system and the rasping system. The report is followed by discussion. [Det. 8½ pp. 2 tab. 2 gr. 2 dr. 11 ref.]

548. Some Specialized Equipment Used in European Compost Systems. *Compost Science*, 4:1:7, Spring 1963.

Briefly discusses refuse processing in European composting operations and describes some of the equipment used for the preparation of refuse for composting or for the refinement of the compost for later use. Includes: (1) two types of screens for the separation of fine particles from raw refuse—the rotary screen, and the vibrating screen; (2) two machines for the grinding of raw refuse—the hammermill, and the rasping machine; (3) the roller crusher for refuse pulverization; and (4) three types of separators for removing heavy and resilient particles from the refuse—the ballistic separator, the secator, and the inclined plate conveyor separator. (See item No. 549.) [Det. 4 pp. 11 ill. 3 diag. 6 ref.]

549. Some Specialized Equipment Used in European Compost Systems. *International Research Group on Refuse Disposal Information Bulletin No. 18*, p. 1, August 1963.

Reprint. (See item No. 548.) [Det. 4 pp. 11 ill. 3 diag. 6 ref.]

Wiley, John S.; and Spillane, Janet T.

550. Refuse-Sludge Composting in Windrows and Bins. *Compost Science*, 2:4:18, Winter 1962.

Originally appeared in the September 1961 issue of the *Journal of the Sanitary Engineering Division, Proceedings of the American Society of Civil Engineers*. (See item No. 373 of the supplement E bibliography.) Describes the successful composting of municipal refuse and refuse-sludge mixtures achieved at Chandler, Ariz., in 2 runs involving 4 windrows and 25 aeration bins. Gives the composting results, including temperatures, oxygen concentrations, pH values, chemical analyses, weight and volume measurements, and sanitary aspects. The composting materials were turned an average of 5.1 times by regrinding and were composted for a mean of 34.4 days. The two methods produced very similar results, with an average decomposition of 38.8 percent of the volatile solids. The raw refuse was of poor quality, and the sludge had a high-water content. Pasteurizing temperatures were maintained for days, and there were few odor or fly problems. The windrow method appears to be practical for plant-scale use and should adequately decompose refuse or refuse-sludge mixture in a total time of about 5 weeks with five vigorous turnings during the first 3 weeks. In comparison with laboratory mechanical composting, the two outdoor methods appeared to accomplish about the same decomposition in 30 to 40 days that was accomplished in mechanical units with continuous aeration and mixing in about 9 days. [Tech. 8 pp. 10 tab. 3 gr. 7 ref.]

Wilmes, L. W.

551. AN ILLUSTRATED TOUR OF AN OVERSEAS COMPOST PLANT. *Compost Science*, 3:4:12, Winter 1963.

A description of the operation of the composting plant in Arnhem, the Netherlands. Follows the process from the delivery of the refuse by collection vehicles to the final stages in the preparation of the organic fertilizer. On arrival, refuse vehicles are weighed, their loads are dumped into two reception hoppers, and bulky items from their salvage compartments are dumped close to a combustion furnace. Conveyors take the refuse under ferrous metal-extracting magnets and into the rasping machine. From the rasping machine, the refuse is further reduced, and separated by a hammermill. It then goes through a magnesium roller crusher, is carried onto an electrically driven belt conveyor, and is dropped from a slowly rotating arm into a semicircular heap. The heaps are turned over twice by a front end loader, once after 4 weeks and a second time after 8 weeks. Two months later the product is ready to use as compost. [Det. 2 pp. 3 ill.]

Yadava, L. S.

552. URBAN COMPOST AND SEWAGE DEVELOPMENT WORK IN INDIA. *Compost Science*, 3:4:30, Winter 1963.

Describes India's efforts to utilize municipal wastes. A scheme on town composting has been established as a part of the Ministry of Food and Agriculture, under which it is necessary for all municipal committees to see that the entire refuse available in their areas is carefully collected and converted into compost and supplied to agriculturists of the surrounding areas. The Bangalore method (not fermentation method), after having been extensively tested, is now invariably followed in the municipalities of India for composting city wastes. It is improper to dispose of refuse in any manner other than returning it to agricultural land. The article discusses the working of the town compost scheme, the Bangalore composting method, bottlenecks which are hampering the extension of composting to all city waste throughout the country, the distribution of town compost, the need for good quality compost, mechanical composting, and sewage utilization schemes. [Det. 4 pp. 1 tab.]

Ziegler, L.

553. MOISTURE DETERMINATION OF REFUSE WITH THE GEISENHEIMER WATER PLIERS. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 24, May 1963.

Bacterial activity during composting is at a peak when a certain and constant amount of water is made available by the composting material. The optimum moisture content of fine refuse for composting, commonly reported in percentage, depends upon the moisture capacity of the particular refuse. For this reason, refuse must be examined for both its moisture content and moisture capacity. The article describes the use of the Geisenheimer water pliers, built by Dr. Tepe for the determination of free water in soils, but which can be successfully adapted to serve in refuse composting by adding an auxiliary container. The apparatus consists of a pair of pliers, the points of which are triangular and a piece of activated filter paper clamped between them. The pliers are pushed into the material to be tested and left for a certain period. The filter paper becomes moistened inwardly from the edges according to the amount of free water. Because ground refuse is very heterogeneous compared to soil, an auxiliary apparatus is needed in which the refuse can be mixed and compressed to a certain density. [Det. 2 pp. 1 ill.]

J. DISPOSAL—Garbage Grinding

Anonymous

554. DO GROUND FOOD WASTES AFFECT SEWAGE WORKS? *Wastes Engineering*, 33:3:133, March 1962.

Briefly states results of a study on the use of food waste grinders in Denver, Colo., Detroit, Mich., and Los Angeles, Calif. In Aurora, Colo., where approximately 60 percent of the homes connected to the city's treatment plant are equipped with the units, the incremental increase in BOD and suspended solids concentrations was not of a great magnitude. A review of the average daily sewage characteristics in the Detroit area indicates that, with the exception of grease, sewage concentrations are not increasing even though over 150,000 disposal units are in use. In Los Angeles, where some 50 percent of the homes are equipped with disposers and the number is increasing each year, the concentration of the sewage has consistently decreased over the past five years. Treatment costs per million gallons have remained rather constant over the same period, tending to indicate that the increasing use of disposers is creating no serious treatment problems. [News. ½ p.]

555. The Food Waste Disposer and the Septic Tank: Can They Live in Peace? *Domestic Engineering*, 202:1:61, July 1963.

Discusses whether or not the food waste disposer and the septic tank can coexist in peace and profit. Takes the position that if the septic tank is sized properly and if the correct-size leaching area is provided, the food waste disposer is entirely compatible with the septic tank method of sewage disposal. Gives these facts behind this position: (1) at least 17 percent of the disposers presently in use are on septic tanks, and most of them are apparently functioning without problems; (2) the FHA assumes the compatibility in its Minimum Property Standards; (3) in a survey of nearly 100 communities across the country, the *Domestic Engineering* staff was not able to find any that prohibited installation of food waste disposers on septic tanks; and (4) this position is substantiated by a report entitled, "Effect of Food Waste Grinders on Septic Tank Systems," published by the Public Health Service's Sanitary Engineering Center and based on extensive field studies. It is recommended that if a disposer is installed, the minimum size septic tank should be increased 50 percent and the minimum size absorption field 20 to 25 percent. [Det. 5 pp. 1 ill.]

556. How To Sell More Garbage Disposers. *The Journal of Plumbing, Heating, and Air-Conditioning*, 133:12:46, September 1962.

Tells of one contractor's efforts in the marketing of garbage disposers. Adoption of an aggressive merchandising program has resulted in the sale of as many as 8 to 10 units a week. The program involves five phases: front display; inside display; working model demonstration; advertising; and guaranteed installation and service. [Gen. 1 p. 2 ill.]

557. Meet Mrs. America: She's the Key to Your Market Break-Through in Disposers. *Domestic Engineering*, 202:1:64, July 1963.

Tells of a nationwide survey made by Domestic Engineering reporters to gauge the popularity of food-waste disposers with housewives. Twenty-two percent of the women surveyed owned disposers and were completely satisfied with them. About 85 percent of the women who did not own disposers wished they had one. Main reasons given by the housewives for liking the disposers were convenience, sanitation, and reasonable cost. Gives specific reactions by some of the women when asked about food waste disposer. [Gen. 3½ pp. 3 ill.]

558. Of Interest. *Refuse Removal Journal*, 5:5:29, May 1962.

Discusses the pros and cons of the use of garbage grinders. On the positive side, there seem to be three principal arguments: use of grinders lightens the refuse load for collectors, does away with organic garbage in refuse cans, and makes added convenience for housewives. Three arguments against grinders are listed: kitchen waste is only a small proportion of the total waste; grease and other matter in ground garbage plug up some types of private and municipal drains, and sewage treatment plants in some cases cannot treat sewage properly because of the heavier load in the system. Canada, as well as the United States, has been the scene of controversy over the use of garbage grinders. Also briefly discusses a model ordinance adopted by the Allegheny County (Pa.) Board of Health permitting homeowners to burn refuse in their back yards. [Gen. ⅓ p.]

559. That Monstrosity of the Dark Ages, the Garbage Can—Is America Getting Ready to Junk It? *Domestic Engineering*, 202:1:57, July 1963.

Gives reasons why the garbage grinder will create big opportunities for the plumbing industry in the future: (1) market saturation for the product is only 10 percent, and sales patterns for other appliances indicate that saturation builds up to the 10 percent level slowly, and then zooms; (2) the garbage grinder is easily installed, keeping labor costs down, but must be installed by a qualified plumber; (3) some communities require garbage grinders in all new buildings to help solve the city's disposal problems; and (4) the communities that forbid the use of grinders because of the fear of loading the sewage system too heavily, already have inadequate sewage systems and should improve the systems rather than outlaw garbage disposers. Lists and illustrates 12 makes of domestic food waste disposers. [Gen. 4 pp. 12 ill.]

560. They Use the Shock Sell and the Soft Sell. *Domestic Engineering*, 202:1:70, July 1963.

Explains the merchandising program used by a Rockford, Ill., plumbing firm which helped it sell 250 food waste disposers in 1962. The firm submits bids to builders for installation of disposers in new and remodeled homes, operates an attractive showroom in which the units are on display, introduces prospective customers to food waste disposers through letters and newspaper advertising, offers a free 30-day home trial, keeps its journeymen stocked with disposer literature, and holds periodic meetings to brief its employees on technical aspects of new products and selling techniques. [Gen. 4 pp. 6 ill.]

561. What the Women of America Told Us About Food Waste Disposers. *Domestic Engineering*, 202:1:67, July 1963.

Summarizes the reactions of American housewives when asked about their food waste disposers. Both owners and nonowners were quizzed. Questions asked were: (1) Are you satisfied with the way your disposer works? (2) What are its main advantages? (3) How much of your food waste goes into your disposer? (4) Did your disposer come with the house? (5) If you purchased your disposer, what influenced you to buy it, and where did you buy it? (6) Have you ever had maintenance problems? (7) How old is your disposer? (8) Do you consider it a necessity or luxury? (9) If you had to do it again, would you buy another disposer, or some other appliance instead? Those not owning disposers were asked: (1) Do you know how a disposer works? (2) Would you like to own one? (3) If you decided to buy a disposer, where would you go for it? (4) Has anyone ever tried to sell you a disposer? (5) How much do you think a disposer costs? [Det. 2 pp.]

Bowerman, F. R.; and Dryden, Franklin D.
562. Garbage, Detergents, and Sewers. *Journal of the Water Pollution Control Federation*, 34:5:475, May 1962.

Describes a recent study conducted in Los Angeles County, Calif., to determine the effects of garbage grinders and detergents on grease contributions to sewers in a residential community. The unincorporated community of Altadena was chosen for the study because of its ideal location high on the alluvial slope against the San Gabriel mountains where no sewage flow enters the area from above. A house-to-house survey of 600 homes chosen as representative, revealed that approximately 35 percent were equipped with grinders. The procedure for sampling from the sewer consisted of taking hand-dipped samples at 15 minute intervals; 4 samples each hour were composited to give twenty-four 1-hour samples, each of which was analyzed separately. Graphs give hourly sewage flow, BOD concentrations and quantities, suspended solids concentrations and quantities, ammonia concentration as nitrogen, and grease concentrations and quantities. This data is plotted on a final graph and results in a broad extrapolation estimating total grease contributions from grinders and detergents. The article also describes sewage collection system problems, a procedure for cleaning inverted siphons, grease content in the sewers, grease composition and characteristics, role of detergents, and grease settlement. [Det. 20 pp. 14 ill. 1 diag. 1 map. 9 gr. 4 ref.]

Clark, Curtis M.; and Watson, K. S.
563. Garbage Grinders Add Only 30 Percent. *The American City*, 77:6:102, June 1962.

Describes a test conducted in Hoffman Heights, a subdivision of Aurora, Colo., on the effects of food waste disposers on the sewage system. The percentage of residences using disposers was increased from 65 to 88 percent with the installation of 338 portable units, and sewer conditions were observed and analyzed. Based on the results, these conclusions were reached: (1) disposers increase the per capita BOD and suspended-solids loading by about 30 percent; (2) the grease concentration and the quantity of sewage discharged is not appreciably increased; (3) there is a definite difference in BOD and suspended-solids loadings during the mid-morning and early evening hours; and (4) a 30-percent increase in load is an ample design figure for renovating sewage-treatment plants or designing new ones that will receive ground garbage from private dwellings. [Det. 3½ pp. 4 tab. 5 gr.]

Davis, Peter L.; and Black, Ralph J.
564. Effects of Garbage Grinding on Sewage Systems and Environmental Sanitation. *The APWA Reporter*, 29:12:16, December 1962.

Summarizes the effects which garbage grinding has upon refuse collection services, fly production, rat populations, sewer systems, primary treatment, secondary treatment, sludge digestion, and septic tank systems. Conclusions reached regarding the effects of a communitywide installation of garbage grinders include: (1) amount of refuse collected can be expected to be reduced by less than 10 percent, and savings in collection cost will be very slight unless the installation of the grinders enables the community to discontinue separate refuse collections; (2) the backyard fly and rodent problems may be greatly reduced; (3) even a 50 percent increase in solids will not cause difficulties in sewer lines, unless a problem exists in the lines before the addition of ground garbage; (4) garbage solids can be handled at sewage treatment plants, and some of the increased costs from handling the garbage can be offset by the use of additional gas to run engines or from sale of increased quantities of dried sludge, and (6) both ground food waste and sewage can be successfully handled by septic tank systems. [Gen. 3 pp. 24 ref.]

Watson, Kenneth S.
565. Water Requirements of Dishwashers and Food Waste Disposers. *Journal of the American Water Works Association*, 55:5:555, May 1963.

This study attempts to answer the question, "How much disposal water is used by the home food waste disposer and the dishwasher?" Data for the disposers was collected by means of a telemetering system in which sensing devices located adjacent to disposers in 26 homes and connected to the telephone network actuated recording units at a water management laboratory. It was found that disposers were used on an average of 3.88 times per day with 95 percent of the units being used less than 6.31 times per day, or 2.18 minutes per day with 95 percent of the units being used less than 3.64 minutes per day. In order to determine the amount of water used, faucet flow rates were calibrated at the normal setting for disposer use, at maximum flow with aerators, and at maximum flow without aerators. The maximum flow with aerator is probably the most significant of the three flow rates. One difficulty in determining water quantity used comes from not knowing the amount of water used prior to, and after disposal operation. It was calculated that 2,300 to 3,400 gallons of water are used for disposal operations per year at a cost of $0.69 to $1.02. Generalizations are made from this disposer information. [Det. 4½ pp. 1 tab. 5 gr.]

Watson, Kenneth S.; and Clark, Curtis M.
566. How Food Waste Disposers Affect Plant Design Criteria. *Public Works*, 93:6:105, June 1962.

Report on an intensive study of the effects of home food waste disposers on sewage treatment units conducted in Hoffman Heights, a suburb of Aurora, Colo. Summarizes the original work done in Aurora from 1956 through 1960 and gives procedures and results of the recent study. It was found that BOD and suspended solids increased about 30 percent for the population served by disposers, while no increase in volume of flow or grease accumulation appeared evident. [Det. 3 pp. 1 tab. 3 gr.]

567. What Is the Effect of Food Wastes on Sewage Strength? *Wastes Engineering*, 33:7:355, July 1962.

In an effort to refine results from an earlier investigation in Aurora, Colo., to determine the load contributed to the sewer system by a large percentage of built-in food waste disposers, a supplementary study was made in Hoffman Heights, a subdivision of Aurora. Portable disposers were used, consigned to homes in the area for a test period of 2 months. These portable units were helpful in making the study, because a significant number could be added to the sewer system in a short period of time and the loadings before the disposers were in use could be readily compared with loadings after they went into operation. A Parshall flume and recorder was installed at the Hoffman Heights pumping station. Samples of the sewage from this area were collected and analyzed from July 12, 1961, to August 11, 1961. A total of 338 portable units was delivered to residences, bringing the percentage of the population in the subdivision served by disposers up to 88 percent. It was concluded that: average increase in loading BOD was 0.052 pounds per capita per day; average increase in loading in suspended solids was 0.064 pounds per capita per day; these loadings were consistent with those originally developed for the total city in which considerable commercial establishment dilution was present; no change in grease concentration of the sewage could be detected; two peak concentration periods occurred, between 8 and 10:30 a.m. and 6 and 9 p.m.; a 30-percent increase in load could be used as a conservative design figure for renovating or designing sewage treatment plants. [Ext. 1 p.]

K. DISPOSAL—Incineration

Andreas, E.

568. Grinding Harbor and Bulky Refuse in Amsterdam. *International Research Group on Refuse Disposal Information Bulletin No. 18*, p. 24. August 1963.

Describes the new hammermill installed at the Amsterdam, the Netherlands, incinerator plant used to grind harbor and bulky refuse prior to incineration. The most important part of the grinding plant is the impact crusher, which weighs 52 tons, has a 13 ton rotor with a centrifugal movement of 16,000 kilograms per square meter, and has a throat opening of 1.5 meters by 3 meters. After more than 10 months of continuous operation for about 8 to 10 hours per day, it is concluded that the plant completely fulfills its purpose. The amount processed is 120 to 200 cubic meters per hour. The refuse consists of large crates, old furniture, mattresses, barrels, refrigerators, harbor masts, ship covers, carpets, stone, concrete, and various other bulky materials. [Det. 2 pp. 1 ill.]

Anonymous

569. Algiers Incinerator Has a Modern Stoker System. *Refuse Removal Journal*, 5:9:42, September 1962.

A 70-ton stoker system, which has 11,000 individual alloy cast-iron grates and is capable of handling 200 tons of municipal refuse daily, is the heart of the recently built Algiers incinerator plant in New Orleans, La. The stoker consists of two conveyors—one which is 26 feet long and operating horizontally, and the other 20 feet long and operating on a sloping plane. Describes the operation of the stoker system The incinator will reduce combustible refuse to one-tenth or less of its original volume, and air pollution control will be vastly improved because of the superior burning efficiency and special devices designed to eliminate fly ash and smoke nuisance. [Gen. 1 p. 2 ill.]

570. Baltimore Uses New Lift Trucks at Incinerator. *Refuse Removal Journal*, 6:1:30, January 1963.

The city of Baltimore, Md., is using two specially built trucks with hoists to transfer residue from its municipal incinerators to awaiting dump trucks. The trucks, each of 24,000-pound capacity, feature a special, low, collapsible-height mast, which permits the units to travel through a low doorway, yet operate outdoors where heights of up to 17½ feet can be reached. [News. ⅓ p. 1 ill.]

571. Chicago Proposes Bond Issue for Incinerators. *Refuse Removal Journal*, 5:4:22, April 1962.

Chicago, Ill., has its refuse disposal problems: the city must dispose of 18,000 cubic yards of refuse daily, and almost all available disposal sites within the city have been filled. City officials have stated that it is necessary for the city to prepare at once a program of total incineration of refuse. Chicago now operates two plants with a combined capacity of 1920 tons daily, a third 1,200-ton capacity incinerator is presently being constructed, and a fourth of the same capacity is needed. The unique feature of the two new incineration plants is the revenue that they will return to the city through the sale of steam generated by combustion. [Gen. 1 p.]

572. Complete Sludge Disposal for The Small Town. *Public Works*, 93:2:110, February 1962.

Describes a new sludge disposal unit which consists of a mechanical dewaterer and a small furnace and is designed for use by communities in the 10,000 population range. The dewaterer is a series operation of two basically different liquid-solids separation processes. The furnace unit is cylindrical in structure with a number of solid refactory hearths mounted vertically one above the other. Sludge cake is fed through the roof,, distriubted over each hearth by rabble arms and teeth, and falls from hearth to hearth countercurrent to the flow of hot gases, leaving the furnance as a sterile ash. [Gen. 1 p. 1 diag. 1 tab.]

573. Cyclones Clean Incinerator Stack Discharge. *Public Works*, 93:5:170, May 1962.

Two involute cyclone collectors installed at the Islip, Long Island, N.Y., incinerator plant are designed to clean the gases discharged by two 150-ton-per-day furnaces. By using an outdoor circular steel cooling tower in conjunction with outdoor location of the collector, fan, and stack, the size of the building was reduced considerably. [News. ¼ p. 1 ill.]

574. Darien, Conn., Enlarges Its Incinerator. *Refuse Removal Journal*, 5:3:28, March 1962.

The Town of Darien, Conn., recently awarded contracts for the renovation and modernization of the existing municipal incineration plant. The improvement, which will include mechanically operated ash-conveying equipment and a monorail type of crane, will result in a rated capacity of 130 tons per 24 hours of operation and will cost approximately $300,000. The project, expected to be completed during 1962, will give Darien one of the most modern incineration facilities in the East. [News. ⅓ p.]

575. Development of Crewe's Refuse Disposal Plant. *Public Cleansing*, 53:10:495, October 1963.

A description of the refuse incinerator in Crewe, England. The original plant was built in 1930 and recently has undergone a major reconstruction to accommodate the increasing amount of refuse generated by the town. Discussion follows the report. [Gen. 3½ pp.]

576. Europe's Latest Plant. *Public Cleansing*, 52:2:80, February 1962.

Describes the new refuse incinerator plant in Rotterdam, Netherlands. The plant consists of four incinerators, each with a maximum capacity of 16 tons per hour. Each half of the plant is independent of the other so that when the annual summer overhaul takes place, the plant can continue to operate. Lists the equipment installed in the incinerator, including steam and electric generating equipment, water tube boilers, electrostatic precipitators, ash removal equipment, overhead cranes, a pneumatic dust-conveying system, turbo alternators, a carcase-incinerating chamber, and a grinder for reducing bulky material [Gen. 2½ pp. 1 diag.]

577. Incineration for Retail Stores. *Modern Sanitation and Building Maintenance*, 15:7:22, July 1963.

Tells how two southern retail stores have solved their trash disposal problems through the use of gas-fired incinerators. One of the stores, a department store in Louisville, Ky., has found that its incinerator eliminates a $2,500 expenditure on trash collection, the unsightliness from trash accumulation, and pilferage by concealing merchandise in presumably empty cartons. Store management, working with an incinerator manufacturer, selected the incinerator on the basis of peak trash loads encountered and the specifications of Louisville's Smoke Board. The other store, a 5-and-10 store in Macon, Ga., had been at the mercy of the salvage company which picked up the trash before installation of its incinerator. The salvagers collected the trash at its convenience, and often there were long intervals between pickups when trash accumulated. Few details of the incinerator designs are given. [Gen. 2 pp. 4 ill.]

578. Incineration of Municipal Garbage. *Engineering*, 193:5017:778, June 15, 1962.

Briefly reports on discussion of the incineration of municipal garbage at the Second Annual Congress of the International Research Group on Refuse Disposal held in Essen, Germany. It was said that the principles of firing techniques were not generally understood; that it was not sufficient to have just a high temperature and to neglect the flow of oxygen; that too often the lack of oxygen merely led, to high temperatures, extensive postcombustion, and then poor service allowed the slag to melt and damage the kiln lining; and that delayed drying and ignition due to poor circulation of the furnace gas was another cause of trouble, usually brought about by improper design of the furnace. Many of these defects have been overcome in the Volund system. A Swiss firm was reported to have built a new type of incinerator in which use is made of back firing to intensively dry and then ignite the garbage. Data on efficiency of garbage incinerators that produced steam were not available. One difficulty was that the calorific value of the garbage could never be usefully measured because the nature of the material changed so rapidly. [News ½ p.]

579. Incinerator Burns Away Litter Problem at Suburban Shop-Rite Supermarket. *Modern Sanitation and Building Maintenance*, 14:8:40, August 1962.

This suburban supermarket in Millburn, N.J., uses a quality incinerator specially manufactured for supermarkets, to consume its 1,500 to 2,000 pounds of boxes, wooden crates, paper, wire, and store trash each week. The incinerator has the unusual capacity of burning waste so completely that the remaining quantity of ash is only 1/500 of the original waste. This combustion efficiency is due largely to a semiparabolic main combustion chamber, and three-stage combustion occurring in three chambers. The incinerator is gas-burning and has fly-ash controls to prevent nuisance to neighbors. [Gen. 1½ pp. 3 ill.]

580. An Incinerator for New Orleans. *Public Works*, 93:10:150, October 1962.

A 70-ton stoker, which has 11,000 alloy cast iron grates, is 40 feet long, 21 feet high, and 12½ feet wide, and can handle 200 tons of municipal refuse daily, has been installed in the new million-dollar Algiers incinerator plant in New Orleans, La. [News. ¼ p. 1 ill.]

581. Incinerator Hoist. *Public Works*, 93:1:130, January 1962.

The Rye, N.Y., incinerator is equipped with a 1½-cubic yard lever arm grapple operating from a 6,000-pound capacity monorail hoist. The grapple, which handles 150 tons of refuse daily, eliminates manual pickup from the plant storage pit which sometimes contains poisonous fumes resulting from continuous mixing of various kinds of refuse. [News. ¼ p. 1 ill.]

582. Incinerators for Hong Kong. *Public Cleansing*, 53:5:230, May 1963.

The city of Hong Kong has awarded a contract to a British manufacturer for the installation of a 500-ton-per-day incineration plant. The plant will contain three incinerator units, with provision for a fourth which may be constructed in the future. Waste heat is to be used for steam and electricity production. Oil burners are to be included to assist in the burning of excessively wet refuse. Dust and grit will be removed by multicyclone grit collectors. Once refuse enters the plant, there will be no manual operation required until final discharge of quenched clinker. [News. 1 p.]

583. Long-Lasting Protection. *The American City*, 78:8:27, August 1963.

When the town of Belmont, Mass., constructed its new incinerator, officials selected a design that placed all equipment beyond the ignition chamber outside the building proper to reduce building costs. However, protection of the exposed metal surfaces posed a serious problem. After numerous unsuccessful coatings had been tried, city officials engaged some specialists in the protection of metals against corrosion to recommend a means of protecting the structure. After a survey of the incinerator, the company recommended a coating which is a combination of silicone resins and ceramic frits that withstands constant temperatures of up to 1,400° F. and provides resistance to corrosion, chemical attack, and weathering. [News. ½ p. 1 ill.]

584. The Munich Refuse Incineration Power Plant. *The APWA Reporter*, 30:9:16, September 1963.

Describes a power plant study for Munich, Germany, in which refuse and pulverized bituminous coal are to be used as fuels. This concept is somewhat different from the popular refuse incineration approach in the United States, which is to *consider* utilizing the waste heat produced by incineration. This difference in concept is noteworthy because the heat value of Munich refuse is considerably less than that of refuse in the United States. It is also interesting to note the effort made to control slagging of boiler tubes, a problem that has plagued incineration waste heat boiler installations in this country, and the use of electrostatic precipitators for fly ash control. [Det. 1 p.]

585. A New Grate for Refuse Burning. *Public Cleansing*, 53:6:270, June 1963.

Describes the grate recently installed in the North Tonowanda, N.Y., incinerator plant. The principle of the grate evolves around the provision of alternating rows of movable grates arranged to reciprocate between rows of stationary grates. The grates of the first section, which are below and adjacent to the material inlet, are arranged in a relatively steep decline from the inlet toward the discharge end of the chamber. The second section of grates is contiguous with the first section and extends toward the discharge end of the chamber on a lesser angle of decline. All the constructional work involved in the provision of discharge facilities to each of a number of separate static firing grates and in relation to a series of individual furnace chambers, is eliminated. The cost of the grate mechanism was 7,000 pounds and total expenditure with building extensions and modifications was 37,000 pounds. [Det. 2 pp.]

586. A New Incinerator. *Smokeless Air*, 33:123:62, Autumn 1962.

A short summary of the operation of a new, small-scale incinerator produced by a British manufacturer. The incinerator has been designed to deal with refuse in a way that will meet the requirements of a smoke control area. The entry of air into the furnace and the chimney draught is controlled. Secondary air is introduced into the top of the furnace through a series of ports, thus controlling the height of the flame, giving a better mix, and supplying extra oxygen. The secondary air is supplied by a centrifugal electric fan, which is secured to the shell of the incinerator. These factors, combined with a keyed firebrick lining, produce conditions of intense heat and mixing necessary for good combustion. The unique secondary furnace fitted to the top of the incinerator is designed to complete the combustion of residual smoke. Difficult wastes are dealt with by introduction of auxiliary fire using oil or town gas into the bottom of the furnace, assisting the complete combustion of the material. Grit emission is prevented by a low resistance grit-arrestor set in the chimney. Three models are available having capacities of 10, 20, and 40 cwt. of refuse per 8-hour period. [News. 1 p. 1 ill.]

587. New Incinerator for Frankfurt. *Public Cleansing*, 52:10:436, October 1962.

The city of Frankfurt-on-the Main, Germany, has decided to build a Von Roll refuse incineration plant. Eventually the plant will be equipped with four Von Roll furnaces, capable of destructing 1,200 tons of refuse per day. The plant shall be erected beside a combined power generating and district heating station, and steam from refuse incineration will be used for production of electrical energy and for heating purposes. [News. ⅓ p.]

588. A NEW SLUDGE-DISPOSAL METHOD. *The American City*, 77:6:175, June 1962.

Describes a new closed system of sludge disposal that requires no digestion tanks, and uses a centrifuge for dewatering and a "fluid-bed reactor" to incinerate the solids. The system recently proved itself through 18 months of pilot-plant testing at the sewage treatment plant serving New Rochelle, N.Y. The pilot plant showed an initial cost of 60 to 75 percent of a conventional sludge disposal system, an operating cost 25 percent below that of conventional systems, and land requirements that are about 10 percent of those of conventional systems. [Det. 1⅓ pp. 1 ill. 1 diag.]

589. NEW SMOKELESS INCINERATOR. *Smokeless Air*, 32:121:216, Spring 1962.

A new model of the small-scale (11 cubic-feet capacity) Hoskinson incinerator has recently been introduced, designed especially to consume wet or putrescent material. The incinerator has a gas burner for the ignition of the material, integrated with a specially designed grate of conical design, and an after burner for smoke elimination. The wet refuse is simply loaded into the furnace from above, and smokeless combustion proceeds without further attention. The incinerator is a compact piece of equipment, needing no expert or constant attention. [News. 1 p. 1 ill.]

590. NEW WAY TO INCINERATE CYANIDE WASTES. *Air Engineering*, 4:2:36, February 1962.

Successful disposal of toxic cyanide wastes without danger to the public has been achieved for the first time at an automobile manufacturing plant in Lansing, Mich., through the use of a specially designed incinerator. The equipment consists basically of a giant refractory-lined steel stack, a burner unit, and suitable storage tanks, hoppers, mixing vats, pumps, valves, and controls. Complex cyanide wastes are delivered to the burner site, mixed with waste soluable oils, and burned off at high temperatures. The result is complete disposal with no detectable pollution of the air and no danger of stream pollution. The article describes the stack sampling method, how the incinerator system operates, the visual monitoring annunciator, and starting up the burner. [Det. 2½ pp. 3 ill. 1 diag.]

591. NEW YORK DEVELOPS NEW GAS INCINERATOR. *Gas*, 38:11:94, November 1962.

A new type of gas-fired incinerator which will reduce air pollution has been installed in an 868-apartment federally aided housing development in the Bronx, New York City, N.Y. Major features of the incinerator include: a high temperature combustion chamber, where temperatures of 1,400° to 1,500° F. will completely burn many solids which are only partially burned in ordinary incinerators; four compartments in the smoke-settling chamber located at basement level which will trap soot, fly-ash, and other pollutants; an electronic control center which will provide fully automated operation of the incinerator; and scientific measuring devices which will collect information on the efficiency of each component of the incinerator. [News. ½ p. 1 ill.]

592. 100-TONS-A-DAY PLANT FOR BRADFORD. *Public Cleansing*, 52:9:390, September 1962.

Briefly describes the new refuse disposal plant to be installed in Bradford, England. The plant, with a 100-ton-per-day capacity, will incorporate mechanical handling, screening, salvage, and incineration equipment. [News. 1 p.]

593. A REVOLUTIONARY METHOD OF REFUSE INCINERATION. *Public Cleansing*, 53:11:532, November 1963.

Describes a new type of refuse incinerator which has rotating conical combustion and after burner chambers, designed so that bulky items pass slowly and small pieces pass quickly through the flame. Small burned pieces and ashes which might choke the flames are removed continuously, volatile, material and fine dust is burnt effectively in the special after burn chamber. Thus, some of the disadvantages of the conventional shaft furnaces are removed. In addition to performance advantages, the plant has certain financial advantages in that it is a comparatively small installation with a large throughput which will provide for low capital costs. Running costs are low, and refractories are not used, thus providing for a short starting period and low maintenance costs. There are two main designs of this combustion cone plant, one using a 6-foot base diameter cone and another using a 9-foot cone. The incinerators are designed for the burning of crude unsorted refuse and are ideally suited for multiple installations in parallel with common feed and ash removal devices. [Gen. 3½ pp. 1 diag.]

594. RUBBISH. *Engineering*, 193:5018:832, June 22, 1962.

Discusses briefly domestic incineration as a possible means of refuse disposal. One gas-fired incinerator for domestic or hospital use, marketed by a British firm, has a capacity of 2 cubic feet, stands 3 feet high, handles paper, rags, wet waste, and organic material, and has an afterburner which prevents emission of smoke. A certain electrically-fired incinerator, produced by a London company, will collect all the waste from the house during the day, and in the late evening the switch is closed, the elements are energized for a set time, and combustion continues to completion. In those apartment buildings where a refuse chute is used, the chute could be made to terminate in an incinerator large enough to accommodate a day's collection. At a given time in the night, the chute would be automatically closed at the bottom, and the incinerator automatically ignited. Then in the morning the caretaker would simply clear out the ash by a trolley and tip it into the ashpit. The advantages of the individual incinerator are the savings in collection costs by the local authority and the immediate hygienic disposal of waste. Against these must be set the initial cost of the unit, the space it would need in a kitchen, the provision of a separate flue, and the difficulty of getting smokeless combustion without a gas or oil supply for the afterburner. [News. ⅔ p. 3 ill.]

595. Smokeless Burner. *Rubber World*, 146:1: 92, April 1962.

Describes the Hoskinson incinerator, which, by means of an afterburner at the foot of the chimney, automatically eliminates smoke during the burning operation. The packaged unit, fired by either gas or oil, can easily and quickly be installed inside or outside a plant to provide immediate disposal of scrap and rubbish. Materials which have been successfully handled by the unit include rubber, plastics, confidential papers, animal matter, wire insulation, and general refuse. The incinerators range in size from 13 cubic feet to 60 cubic yards, with all but the smallest size having a built-in heat exchanger which transforms rubbish heat into usable hot air or hot water heat. The entire unit is operated by interlocking controls to start the combustion and to bring the smoke eliminating carburetor system into action. As the smoke passes through the carburetor, it is ignited by a small oil or gas burner and burns completely ensuring smokeless emission from the chimney. [News. ⅔ p. 1 ill.]

596. Stockholm Uses Conical Burners To Aid Disposal. *Refuse Removal Journal*, 6:4:16, April 1963.

The city of Stockholm, Sweden, is using two American-made prefabricated, conical refuse burners to supplement the operation of the city's large refractory incinerator. The burners are being used to consume tree limbs, demolition lumber, large boxes, and crates from factories, all of which are not acceptable in the refractory incinerator, and some of the more highly combustible household refuse which is collected. The Stockholm operation is an excellent example of the kind of job these conical burners are designed to do. Communities unable to build large incinerators can dispose of their refuse with one of these less expensive units. The residue from such installations makes excellent landfill material, and it is believed that if one of these burners is used in conjunction with a landfill, the life of the landfill can be increased 10 times. [Gen. 1¼ pp. 2 ill.]

597. Trash Burner Desalts Water Too. *Engineering News-Record*, 171:19:23, November 7, 1963.

The town of Hempstead, N.Y., has a new $6.5 million refuse incinerator plant that burns 750 tons of refuse a day and produces enough heat to operate a 343,000-gallon-per-day seawater evaporator and a 1,250-kilowatt turbine-generator. In the single-stage evaporator, steam from trash-fired boilers passes through pipes submerged in the salt water chamber and heat the salt water, under a slight vacuum, to its boiling point of about 160° F. The resulting salt-free vapor moves into a fresh water collection tank and condenses as it passes over cold incoming salt water pipes. The fresh water and electricity will supply inplant requirements for boilers, cooling apparatus, blowers, pumps, and other equipment. Eventually some of the water may be used to irrigate a town-owned, 200-acre park adjacent to the incinerator. [News. ¼ p.]

598. Use Industrial Waste for Factory Power. *Refuse Removal Journal*, 6:10:26, October 1963.

Discusses the idea of incinerating industrial waste for producing factory power. Large industrial plants that must dispose of their own refuse find incineration advantageous, since steam and hot water can be obtained without the expenditure of other fuels. Before refuse is incinerated, however, it should be stored for sorting and pulverizing. Gives three reasons why this practice is necessary. Included also in the article is a schematic arrangement of a complete plant for the incineration of industrial refuse. [Gen. 1 p. 1 diag.]

599. Volund Incinerator Installed by Fords. *Public Cleansing*, 52:10:446, October 1962.

Describes the new Volund incinerator installed at a factory in Dagenham, England. The plant, which is designed to consume four tons of refuse composed of mainly cellulosic material, contains: a plate conveyor made of continuous overlapping mild steel plates and drag bars running the width of the plates; a troughed, rubber picking belt with a suitable speed variation gear; an elevating conveyor; an adjustable scraper below the head drum for belt cleaning; an ignition grate consisting of a fixed perforated plate receiving air from the forced draught fan; the main burning grate constructed of intermeshing heat-resisting fire bars, alternate one of which are arranged to rock; dampers to control the supply of combustion air to the ignition and burning grates; hoppers beneath the grates to receive fine particles passing through; a casing formed of mild steel with insulating firebricks; an electromagnetic extractor for metal recovery; and a forced draught fan for combustion control. [Det. 2⅓ pp.]

600. Von Roll Blaze a Trail Round the World. *Public Cleansing*, 53:2:59, February 1963.

Lists several new Von Roll refuse incineration plants which will be erected in a number of countries in the world: a plant in Winterthur, Switzerland, containing two 100-ton Von Roll furnaces and delivering its saturated steam to a soap factory; a plant in Geneva, Switzerland, consisting of two furnaces of 400-ton total capacity and utilizing its heat for the production of electrical energy; a plant in Osaka, Japan, with two furnaces, boiler units, and a plant for producing electrical energy; and Von Roll plants at several industrial enterprises in Hanover, Koeln, and Bochum. [News. 1 p.]

Banister, Manly

601. Mobile Leaf Burner. *Popular Mechanics*, 120:3:184, September 1963.

Describes how to build a mobile leaf burner. The burner consists of a 30-gallon steel drum on wheels with a 7-inch deep ash pit at the bottom of the drum and a lever-controlled ash-dumping mechanism. The drum is perforated with draft holes and has a conical hood cut from 24-gauge sheet metal. A hardware-cloth screen over the opening at the top of the conical hood traps hot ashes and keeps them from flying out the top of the burner when caught in the updraft from the fire. [Det. 4½ pp. 8 ill. 4 diag.]

Benn, Charles L.

602. Onsite Domestic Incinerators. *The APWA Reporter*, 30:1:16, January 1963.

A complete discussion of the modern "smokeless and odorless" domestic gas incinerator. Describes how the incinerator unit operates, and gives the installation and operating costs of the unit. For the complete elimination of smoke and odors, incineration is accomplished in two stages. Drying, ignition, and combustion of the charge takes place in the primary chamber. The flue products produced flow through a system of flue passage ways, a settling chamber, and into a secondary chamber where they pass through an enveloping flame and are totally oxidized. Only one burner is needed, so designed as to distribute part of its output into the primary chamber and the remainder into the secondary chamber. Installation of onsite domestic gas incinerators can make a major contribution toward the reduction of municipal refuse collection and disposal costs. [Det. 1½ pp.]

Bjorkman, A.

603. Tepees Burn Stockholm's Rubbish. *Public Cleansing*, 52:12:546, December 1962.

An unexpected and prolonged increase in refuse quantity coupled with the fact that no site for a new incinerator will be available for some time, has led the city of Stockholm, Sweden, to purchase two American-made conical burners. The burners, each of which has a daily capacity of 80 tons, are not suitable for domestic refuse but will be used to dispose of the large quantities of wrapping material, casings, old furniture, demolition timber, and similar refuse. [News. 2 pp. 3 ill.]

Calaceto, Ralph R.

604. Sludge Incinerator Fly Ash Controlled by Cyclonic Scrubber. *Public Works*, 94:2:113, February 1963.

Describes the sludge incinerator in Detroit, Mich., and the cyclonic jet scrubber and precooler which handle the exhaust gases from the incinerator. The plant contains four furnaces, each 22 feet in diameter, with 11 internal hearths, each capable of handling 12 to 16 tons of material per hour. The cyclonic scrubber, which was installed in 1959 to better meet city air pollution requirements, has demonstrated a fly ash collection efficiency of 95.9 percent and reduces the average grain loadings to 0.145 grain per cubic foot. [Det. 2 pp. 3 ill. 1 diag.]

Carrol, A. F. G.

605. Saskatoon Has Gas-Fired Incinerator Program. *The APWA Reporter*, 30:8:5, August 1963.

Describes the gas-fired domestic incinerator program in the city of Saskatoon, Saskatchewan, Canada. The city buys in large, money-saving quantities, the incinerator units from a power corporation in the province, and sells them to residents at cost, on a monthly basis with no carrying charge. The residents who use the incinerator units get only once-a-month refuse collection from the city and only noncombustible materials are picked up. Installation of the units is financed by adding to the resident's gas bill a surcharge of $1 per month until the unit is completely paid for. Several problems have been encountered in the early stages of the program: only slight cooperation has been received from realtors in advising prospective customers of the incinerator requirement; renters are faced with the problem of investing in a unit for a home which they do not own; and early models have failed mechanically and new parts have not been readily available. The domestic incinerator program appears to be a cost-saving refuse disposal system, however. [Gen. 1 p.]

Clarke, Samuel M.

606. Incinerator Plant Costs. *Public Works*, 93:9:122, September 1962.

Costs of incineration plants vary widely with general cost levels and with general and local market conditions, as well as with differences in design requirements. To demonstrate these variations, the costs of six incineration plants are considered. Several factors influence the general level of construction costs: location, time of construction, monetary status of the construction market and the needs of the individual bidders for new business, and size of the plant. The cost of the building is influenced by these variable factors: foundation and site preparation, materials of construction, enclosure of tipping floor, and unusual structures or equipment. [Gen. 2 pp. 2 ill. 1 tab.]

Cotton, Robert A.

607. For Longer Incinerator Life. *The American City*, 78:11:92, November 1963.

Describes the various forms of refractories available, the materials used in their manufacture, and the different incinerator applications of the refractories. Includes the alumina-silica group, the Sillimanite and Mullite type refractories, silicon-carbide brick, aluminum-oxide brick, zirconia brick, plastic refractories, castable refractories, and mortars. An accompanying table shows some typical analyses of various classes of firebrick. [Det. 3 pp. 2 ill. 1 tab.]

Dahlmeyer, Fred

608. Inexpensive Method Solves Fly Ash Problems. *Public Works*, 93:8:105, August 1962.

Describes the operation of a fly ash control device recently installed in the Hollywood, Fla., refuse incinerator. The apparatus, which cost only $500 to build and install and which produces at least 95 percent efficiency in removing ash, consists of a "wrap-around" settling chamber and two water sprays. Includes a diagram of the device and a graph depicting the relation between total input and fly ash tonnages for 4 months prior to and 4 months after installation of the system. [Det. 2 pp. 1 diag. 1 gr.]

Damianoa, David J.

609. Incinerator Refractory Studies. *The American City*, 77:4:84, April 1962.

Describes the design of the Northwest Incinerator in Philadelphia, Pa. The incinerator represents a departure from the conventional design of refractories. For example: (1) the heat enclosure design is based on the amount of material to be burned, kind of operation, type of furnace, and related factors; (2) the exhaust tile is redesigned to prevent plugging of air holes; (3) a slag drip ledge is built in to protect refractory brick; (4) a new method of fastening the wall-supporting anchor bolts is used; and (5) castable material supports itself in walls up to 40 feet high. A test program has been instituted independent of contract requirements and has proved the innovations successful in operation. [Det. 3½ p. 3 ill.]

Estey, Horace S.

610. An Incinerator Without Frills. *The American City*, 77:12:95, December 1962.

Describes the new 150-ton municipal incinerator in Wellesley, Mass., emphasizing the manner in which it was conceived, designed, and constructed. A 51-acre site in Wellesley near the Needham town line was chosen. Eighty-five percent of the land can be cleared if needed for disposal of incinerator residue. Wellesley may negotiate for the joint use of the incinerator with Needham until the city requires use of the facility at full capacity. To keep construction costs moderate, expensive grinding, weighing, and record-keeping equipment were not included. Rather than awarding a contract to a single low bidder for construction of the incinerator, the city awarded six separate contracts for key items. [Gen. 1⅓ pp. 1 ill.]

Feldstein, Milton

611. Studies on the Analysis of Hydrocarbons From Incinerator Effluents With a Flame Ionization Detector. *Journal of the Air Pollution Control Association*, 12:3:139, March 1962.

Presents details of a method of hydrocarbon analysis through the use of a flame ionization detector, and compares the results obtained with the standard gas chromatographic method. Flame ionization detectors make use of the principle that when a hydrocarbon is introduced into a hydrogen flame, electron concentrations are formed and can be measured. The article describes the apparatus and equipment, analytical procedure, collection of samples, calibration procedure, and calculation of results. Results of analyses are compared to data obtained by gas chromatographic analysis of the same samples. For the series of effluents analyzed, agreement between the two methods is excellent. The flame ionization method provides a more rapid procedure for the analysis and may be considered as a comparable method for the analysis of hydrocarbons. [Det. 2½ pp. 1 diag. 1 gr. 5 tab.]

Fisher, Morris A., and Langer, Gerhard

612. New Instrumentation in Municipal Incinerators. *Refuse Removal Journal*, 5:1:10, January 1962.

Explains some of the new instrumentation being developed to study emissions from incinerator stacks for purposes of improving the design and control of incinerators. Includes descriptions of the dynamic diluter, the ARF particle counter, and the acoustic fly ash monitor. [Det. 3 pp. 2 diag.]

Fox, Earle B., Jr.

613. Cooperation Spells Economical Incineration. *The APWA Reporter*, 30:7:4, July 1963.

Tells how the 49 municipalities in Delaware County, Pa., solved their refuse disposal problems by consolidating to establish the Delaware County Incinerator Authority in 1954, which was later absorbed by the county and renamed the Delaware County Disposal Department. Consulting engineers were hired in 1955 to study the various possible refuse disposal methods open to the county and the final report in 1957 recommended the construction of three incinerator plants and a fourth facility if future population growth warranted another incinerator. Three plants have now been completed, each with a 500-ton-per-24-hour capacity and all located within a 5-mile radius of the densely populated areas. The unique feature of plants 2 and 3 is the utilization of sewage effluent, thereby eliminating the purchase of water. Operating costs of the incinerator plants are reasonable, amounting to $2.26 per ton. Based on current tonnage and 25 years of 3.2 percent for the county bonds, capital costs total $1.46 per ton. [Gen. 1⅔ pp. 3 ill.]

614. 49 Municipalities Join in Countywide Incineration Plan. *Public Works*, 94:2:100, February 1963.

A description of the countywide refuse incineration plan in Delaware County, Pa. The Delaware County Incinerator Authority was established in 1954 to examine and solve the refuse disposal problem. For several reasons landfill operations were not feasible and it was decided to construct three 500-ton incinerators and allow for a fourth if needed in the future. The incinerators, financed through a 1.5 mill tax on county taxpayers and charges to refuse haulers, were located so that all of the densely populated sections are within a 5-mile radius of one of them. The article describes the three incinerators—in Feltonville, Darby Township, and Marple Township. [Det. 5 pp. 5 ill. 1 map.]

Gerhardt, Paul, Jr.

615. Incinerator To Utilize Waste Heat for Steam Generation. *Public Works*, 94:5:100, May 1963.

A description of Southwest Incinerator, the third incinerator to be built in the refuse disposal program in Chicago, Ill. The plant contains four 300-ton-per-day furnaces, each of which are supplemented by a steam generating boiler of 50,000-pounds-per-hour capacity. Sale of steam to neighboring industries is expected to net $125,000 to $150,000 annually. [Det. 2 pp. 2 ill. 1 diag.]

Gewecke, Gordon

616. Built To Fit the Site. *The American City*, 78:6:120, June 1963.

Describes the new incinerator plant built for the town of Islip, Long Island, N.Y. The plant is built against one bank of a gravel pit, eliminating the need for a tall structure. It has combustion chambers integral with the furnaces, short stacks, and no expansion chambers. Outdoor mounted spray chambers made of Mayari-R steel take the place of expansion chambers. Each dust collector contains multiple cyclone tubes varying from 12 to 30 inches in diameter, each of which can take a gas flow of 65,000 cubic feet per minute at 650° F. with a maximum static pressure loss of 3-inches of water. The two rectangular furnaces have a design capacity of 150 tons per unit per 24-hours. Each furnace has its own forced draft fan and induced draft fan. There is one storage pit of 1,800 cubic yard capacity fed through four unloading bays. The overhead crane carries a 2½-cubic-yard-capacity grapple capable of an 1,800-pound payload. [Det. 2 pp. 4 ill.]

Gruber, Charles W.; and Schumann, Charles E.

617. The Use of Adhesive-Coated Paper for Estimating Incinerator Particulate Emissions. *Journal of the Air Pollution Control Association*, 12:8:376, August 1962.

Since air pollution regulations of the Cincinnati Bureau of Air Pollution Control are based upon weight loadings (0.85 pounds of particulates per 1,000 pounds of flue gases, adjusted to 50 percent excess air), each particulate emission test requires from 16 to 24 hours for a two-man team to complete. To reduce this time requirement the effectiveness of using "number of particles per minute" caught on white adhesive paper was investigated. A simplified method, using adhesive-coated paper wrapped around an 8-ounce glass jar, was developed and used in a series of stack tests on different types of incinerators. The article describes the test procedure, the adhesive paper method (preparing the jars, collecting the sample, counting procedure and effect of temperature on adhesive paper), the test results, and a regulation using this method as a tool for controlling excessive emissions from incinerators. [Det. 2½ pp. 2 ill. 2 tab.]

Habeeb, Virginia T.

618. The Case of the Disappearing Household Trash. *The American Home*, 66:4:52, May 1963.

Discusses the domestic gas incinerator. Includes: advantages gained in using the domestic incinerator, wastes which it will and will not dispose of, steps involved in operating the unit, the burning process, utilization of the incinerator residue in the garden, where to install the unit, and availability and cost of the unit. [Gen. 1½ pp. 1 ill.]

Hafeli, R. J.

619. Refuse Analysis. *International Research Group on Refuse Disposal Information Bulletin No. 15*, p. 16, August 1962.

Explains a method for determining the physical composition of refuse. Such information is frequently an important prerequisite to the construction of large incinerators. Includes sample-taking; fractioning; approximate moisture content of samples; sample preparation for determining heat value, ash content, content of combustibles, and residual moisture; determination of residual or hygroscopic moisture; total moisture content of the refuse; and determination of ash (theoretical content). Also gives an example of analysis—sieve analysis and calculations. [Det. 4½ pp. 2 tab.]

Hair, Albert M., Jr.

620. The Incinerator's Anniversary. *The American City*, 77:11:23, November 1962.

A brief description of the 6-year-old incinerator plant in Alexandria, Va. When the municipal sanitary landfill was completed in 1956 and no other land was available, the city decided to construct an incinerator and incineration has since proved to be an efficient and sanitary method for municipal waste disposal. [News. ¼ p.]

Hawkins, George A.

621. The Residue Tells the Story. *The American City*, 78:9:104, September 1963.

Describes the municipal incinerator in Greenwich, Conn. The town built its first incinerator in 1937, a pit and crane type plant containing two rectangular units with rated capacities of 75 tons per 24 hours. The plant has been modernized in recent years by the installation of three hydraulically powered, multicell stokers in each furnace. A new furnace has also been added to the plant. This unit contains the latest in stoker design and is installed in four sections, each section having its own hydraulic control and operated on a time sequence different from the other sections. [Gen. 2½ pp. 5 ill.]

Heaney, Frank L.

622. REGIONAL APPROACH TO INCINERATION. *The APWA Reporter*, 30:1:10, January 1963.

Briefly discusses regional incineration as a means of refuse disposal. Gives approximate incineration costs for medium-sized communities of 20,000 to 30,000 population and contends that an incinerator should be much easier for a municipality to afford if its costs and operations can be shared with adjoining communities. Recent investigations have shown estimated savings as high as one-third for communities of 20,000 to 30,000 if they can join together instead of building separate incinerators. [Gen. 1 p.]

Hemeon, Wesley C. L.

623. GAS CLEANING EFFICIENCY REQUIREMENTS FOR DIFFERENT POLLUTANTS. *Journal of the Air Pollution Control Association*, 12:3:105, March 1962.

The shotgun approach to the abatement of air pollution usually results in installation of corrective equipment that either does not result in noticeable alleviation of the problem or costs much more than the problem demands when considered in relation to the needs of the people offended. The offenses of the shotgun approach may be illustrated by a consideration of air pollution due to apartment house incinerators of large cities. The offensive qualities of incinerator operation may potentially include malodors, obscuring haze due to fine particulate matter in atmospheric suspension, and objectionable deposition of flakes of paper ash on people's premises. The shotgun approach fails to consider whether all three of these are practically objectionable and demands the neutralization of all of them for a perfect control of all emissions. Knowledge is now available whereby the particular needs of a community can be identified and from a consideration of the permissible ground concentration, engineering specifications can be derived for the performance of gas cleaning equipment, required height of stack, or other control measures. The article illustrates these principles in terms of the following common specific nuisance pollutants: smoke and haze, dustfall, incinerator paper ash, metal corrosion, and malodors. [Tech. 3½ pp. 2 tab. 3 ref.]

Houry, E.; and Kain, F. W.

624. *Principles of Design of Smokeless-Odorless Incinerators for Maximum Performance.* Research Bulletin No. 93. Cleveland: American Gas Association Laboratories, December 1962. 41 pp. $2.50.

Presents the operating characteristics of domestic gas-fired incinerators and their design factors which promote a reduction in particulate matter in the effluent, and other means of reducing the amount of particulate matter. Includes methods of eliminating or reducing the uncarbonized residue in the ash without increasing the overall gas consumption determined during a 4-day incinerator effectiveness test, and methods of reducing incinerator surface temperatures. The problems of ash dumping and ash removal were dealt with by evaluating a number of experimental components which would not require a basic design change in present domestic incinerators. A description is presented of the operating characteristics and construction details of a prototype incinerator designed to substantiate the observations and conclusions of this investigation by reducing particulate matter, improving methods of ash dumping and ash removal, reducing surface temperatures, and increasing incinerating efficiency. The results of experimentation with two domestic incinerators equipped with power burners show that the incineration rate can be significantly increased and fuel consumption greatly decreased when compared to the incineration rate and fuel consumption of contemporary incinerators. The research, conducted as a PAR Plan Activity at the American Gas Association Laboratories, was sponsored by the American Gas Association's Committee on Domestic Gas Research under the designation of Project DAG–4M, "Research on Odor Measurement, Reduction of Particulate Matter, Grate Dumping, and Ash Disposal With Domestic Gas-Fired Incinerators." [Tech. 41 pp. 5 ill. 24 diag. 1 gr. 16 tab. 1 ref.]

Incineration Institute of America, Technical Committee

625. *I. I. A. Incinerator Standards.* New York: Incinerator Institute of America, April 1963. 24 pp.

A booklet of incinerator standards containing: (1) definitions of incinerator terminology; (2) waste analysis; (3) classification of incinerators; (4) specifications of incinerators of each class; and (5) specifications of incinerator design and construction. Also includes tables showing the broad classification of wastes to be incinerated, the maximum burning rate of various wastes, free area of barometric dampers, calculations on products of combustion, natural draft stacks or chimneys, induced draft fans, and an incinerator selection chart. A plate with the insignia of the I.I.A. stating that the incinerator conforms to the standards of the I.I.A. and giving registration number, date completed, and the name of the member company is put on all such equipment. [Det. 24 pp.]

Ingram, William T.

626. SAMPLING AND MONITORING INCINERATOR GASES. *1963 American Public Works Association Yearbook*, p. 214.

Describes present stack sampling techniques and the monitoring of an incinerator stack. The work of stack sampling involves two major operations: (1) the determination of the volume rate of flow of the gases; and (2) the collection of samples under conditions representative of the gases passing through the stack. Lists six methods of stack monitoring. This activity is now used primarily to detect changes from some predetermined base and can also be used to provide data for qualification as well. [Gen. 3½ pp.]

Kaiser, E. R.; and Tolciss, J.

627. CONTROL OF AIR POLLUTION FROM THE BURNING OF INSULATED COPPER WIRE. *Journal of the Air Pollution Control Association*, 13:1:5, January 1963.

A series of tests of a batch-type wire burner in commercial use was undertaken by New York University: to obtain quantitative data on the magnitude of the air pollution from the burning of wire insulation under favorable combustion conditions; to test the principle of gas scrubbing with water to remove potential air pollutants from the combustion gas; and to obtain design data for use by others in planning wire burners that would cause only minimum air pollution. The article includes: methods other than burning for the separation of insulation from scrap wire; burning of insulation as a source of air pollution; the state of the wire-burner art; the furnace, afterburner, wire, gas scrubber, and sampling train used in the tests; test procedures; analytical procedures; results of tests—wire yields, production rates, combustion, smoke produced, effectiveness of gas scrubber, total furnace emissions, and neutralization and filtration of scrubber water; and a discussion of results. [Det. 6½ pp. 2 ill. 2 diag. 9 tab. 6 ref.]

628. SMOKELESS BURNING OF AUTOMOBILE BODIES. *Journal of the Air Pollution Control Association*, 12:2:64, February 1962.

A complete discussion of the closed, smokeless burning of automobile bodies. Includes the following: the present state of smokeless incineration of auto bodies; basic factors involved—combustion, and basic equipment features; design of an auto-body burner; test program for the burner—description of the test furnace, instrumentation, preparation of bodies, and burning cycle; general test results—weight and time, sidewall air jets, temperatures, gas analyses, drafts, gas velocities, and material and heat balances; air-pollution test results—smoke, dust loadings, stack-gas odor, afterburner oil consumption and dampering; and costs and throughput—cost of construction, and annual and unit costs. For the test program, a double-ended shed-type furnace with a smokeless afterburner was designed. Such a furnace may be constructed from concrete blocks, firebrick, and used or new steel. The transfer of auto bodies in and out of the furnace can be accomplished on simple rail-supported carts. Two auto bodies can be carted and burned at one time; burning time is 30 minutes, and up to 28 bodies can be burned daily. Complete cost of construction for the double-ended furnace should range between $17,000 and $22,000. [Det. 10 pp. 5 ill. 2 diag. 2 dr. 2 gr. 5 tab. 7 ref.]

Kuckuck, F. D.

629. AN INCINERATOR CAN BE ATTRACTIVE. *The American City*, 78:3:96, March 1963.

A description of the new 165-ton-per-day incinerator plant in Wauwatosa, Wis. The plant is in an ideal central location within the city limits enabling better scheduling of collection vehicles. Although the building is at a considerable distance from any residential area, the large area in front of the plant was landscaped and roadways leading to it were paved. [Gen. 3 pp. 5 ill. 1 map.]

Lenehan, Joseph H.

630. AIR POLLUTION CONTROL IN MUNICIPAL INCINERATION. *Journal of the Air Pollution Control Association*, 12:9:414, September 1962.

The key to successful incineration is the control of air pollution, with special emphasis upon fly ash collection. The requirements of each incinerator installation will dictate the type of fly ash collector best suited. The article describes five types of fly ash collectors for incinerators, giving comparative air pollution control data for each of the collectors. Included are the settling chamber, the scrubber, the cyclone collector, the fabric collector, and the electro-static precipitator. [Det. 4 pp. 2 ill. 3 diag. 1 dr. 1 tab. 9 ref.]

McElwain, John S.

631. GAS INCINERATORS: 12 REASONS WHY YOU CAN SELL THEM. *American Gas Association Monthly*, 45:9:28, September 1963.

Almost every domestic incinerator promotion that has ever been used, developed, or proposed has bogged down with implementation. The article lists faulty complaints of the domestic gas incinerator and other beliefs of customers and retailers which are the reasons for the difficulties in selling the units, and attempts to show why they are faulty. The following are the complaints: "All of of the chimneys in new homes in our area are type B"; "Gas incinerators smell"; "Gas incinerators cook garbage"; "We have good garbage collection in our market"; "The neighbors complain about every gas incinerator we install"; "Builders won't buy them"; "City smoke ordinances prohibit them"; "We have installation problems"; "The gas incinerator doesn't use enough gas"; "The gas incinerator uses too much gas"; "The gas incinerator is no substitute for the grinder"; and "The gas incinerator has a short life." If the domestic gas incinerator does not sell soon, there may be no incinerators left to sell: each year the eight incinerator manufacturers are falling farther behind the peak reached in 1957 through 1959. [Gen. 3 pp. 2 ill.]

McPherson, Howard L.

632. LAB RESEARCH IMPROVES DISPOSER PERFORMANCE. *American Gas Association Monthly*, 45:3:15, March 1963.

Briefly describes research undertaken at American Gas to reduce the particulate matter in the effluents of domestic gas incinerators to a minimum, while using as little fuel gas as possible in the burning process, and to develop more convenient means for dumping and disposing ashes and noncombustible items. Results of this investigation have been published in the A.G.A. Research Bulletin No. 93, "Principles of Design of Smokeless-Odorless Incinerators for Maximum Performance." From the study it was concluded that evidence of some particulate matter in the primary chamber of contemporary models may be attributed to inadequate heat distribution to the charge, or insufficient air at the right places in the charge, or both conditions. To burn combustible particulate matter effectively, such conditions as adequate flame coverage, enough residence time of the effluent in the flame, and sufficient air at the right places are also necessary in the afterburner chamber. By applying fundamental knowledge in addition to that obtained from the study, the Laboratories' engineers developed a prototype incinerator which exhibits the refinements sought. The Laboratories' engineers also made studies with power burners applied to incinerators. [Gen. 1½ pp. 1 ill.]

Mitchell, Robert J.

633. INCINERATOR PROGRAM. *Civil Engineering*, 33:6:64, June 1963.

Describes the development and progress of the countywide incineration program in Delaware County, Pa. Three, 500-ton-per-day incinerators have been built for disposing of refuse from 49 municipalities in the county. Each of the plants is of the traveling-grate type. Plants No. 2 and No. 3 have the unique engineering feature of wet-bottom sedimentation chambers which use the treated effluent from nearby sewage-treatment plants. Describes the fly-ash collection installation and the pattern of waste water use at plant No. 3. (See item No. 634.) [Det. 3 pp. 4 ill. 1 diag. 1 tab.]

634. PENNSYLVANIA COUNTY SELECTS INCINERATORS OVER LANDFILL OPERATION. *Refuse Removal Journal*, 6:8:10, August 1963.

Reprint. See item No. 633. [Det. 3 pp. 4 ill. 1 tab.]

Munson, James S.

635. INCINERATOR HELPS HEAT SHOPPING CENTER. *Air Engineering*, 5:2:18, February 1963.

Describes a unique incinerator system at a shopping center in Vancouver, British Columbia. The incinerator is used not only for the destruction of wood crating material, paper, and carton waste, but also for the provision of heat for the shopping center. The incinerator has a burning capacity of 3,000 pounds of refuse per hour, and provides prompt and efficient disposal of the stores' peak collection of rubbish. Before the incinerator combustion gases are handled by a collector for air pollution control, they are passed through a hot water boiler which provides heating for the center. There is also a boiler bypass for periods when heating is not required. [Gen. 1 p. 1 ill. 1 diag.]

Nickelsporn, Harold B.

636. FACTORS IN INCINERATOR DESIGN. *Public Works*, 93:3:123, March 1962.

A discussion of factors important in the efficient incineration of refuse. Includes: (1) refuse density; (2) the four essentials of complete combustion—air supply, air-refuse mixture, temperature, and combustion time; (3) capacity ratings; (4) furnace heat release; (5) air requirements; (6) gas weights and velocities; (7) furnace heights; and (8) primary and secondary air. Also gives sample design calculations. [Tech. 3 pp. 2 ill. 1 tab.]

O'Connor, Chadwell

637. RUBBER-TIRED LOADER REDUCES NOISE. *The American City*, 78:8:100, August 1963.

The city of Pasadena, Calif., has found many advantages to using a rubber-tired tractor in place of a crawler-type for handling refuse at its municipal incinerator. Previously, the city had operated a crawler tractor on the hard pavement around the incinerator, and this resulted in cracked frames, broken bearings, loosened fixtures, and troublesome noise. Also with this tractor, the operator was close to the ground and more subject to injury from flying objects. After 3 months of operating the new rubber-tired tractor, it was found that this tractor needed a negligible amount of maintenance, less than 5 percent of that needed on the crawler tractor. The rubber-tired tractor also makes much less noise, uses less fuel, and is easier and safer to operate. The city uses laminated tires on its new tractor to solve the blowout problem and a steel plate to protect the underside of the machine. [Gen. 1½ pp. 2 ill.]

Palm, R.

638. REFUSE ANALYSIS. *International Research Group on Refuse Disposal Information Bulletin No. 17*, p. 27, May 1963.

Contends that refuse measurements, operating instructions, construction plans, and even cost, efficiency, and achievement data concerning incineration of refuse are rendered practically useless in Europe by the continuously changing nature of refuse. Plants which are able to incinerate all reasonable refuse classes should be constructed. It is necessary to know about the combustion process of the most varied refuse qualities and compositions in order to build incinerators. [Gen. 1 p.]

Phelps, J. Grady

639. REMOVING CINDERS FROM MUNICIPAL INCINERATORS. *1963 American Public Works Association Yearbook*, p. 208.

Describes some of the problems the city of Miami, Fla., has had in transporting and disposing of cinders from its incinerator and the solutions it has used. The city has found incinerator ash to be excellent fill material to reclaim and enhance both municipal and private property. Several custom-built packing trailers are used to transport the residue. These units were designed to conform with the openings of the incinerator hoppers, to be watertight, and to keep noise to a minimum. The city has recently given thought to the possible use of incinerator residue, properly screened and mixed with hydrated lime, as a base course material in street construction and patching work. In addition, cans and other metal from the residue are salvaged and sold for use in both the steel and copper industry. [Gen. 2½ pp.]

Popovich, M.

640. How To Burn Wood Waste Without Smoke. *Air Engineering*, 4:10:16, October 1962.

A study of wood waste incinerators, initiated in June 1957, at Oregon State College, has resulted in the design of a simple, tepee-shaped steel burner which, under controlled operation, can successfully burn wood wastes with a minimum amount of smoke and particulate emission. The incinerator has tangential overfire air entry producing cyclonic combustion and a long path of travel for burning particles. It is constructed from prefabricated sections and is therefore easy to assemble and disassemble. The article gives design recommendations for wood waste incinerators based upon the Oregon State College studies, and describes the test program conducted to study the effects of variables in burner operation and design upon smoke and cinder discharge. Most sawmill operators can afford this well designed, but simple, steel incinerator, whereas a great many could not remain in business if required to construct a relatively elaborate refractory incinerator of equal performance. [Det. 3 pp. 2 ill. 1 diag. 2 gr.]

Raisch, William

641. There's No Ugliness Here. *The American City*, 77:10:155, October 1962.

Describes the new 200-ton incinerator in Eastchester, N.Y. Designers took special care in blending the incinerator in with the residential surroundings. Aesthetic considerations include careful landscaping, refuse discharge within the building, a mist curtain and vacuum system to control dust, and a fly-ash removal system. The incinerator contains two furnaces, each of which has a new hydraulically operated rocker-type stoker. The stokers feature: (1) minimum "dead" space along the sides and center of the grate; (2) greater depth of grate sections to provide long travel arcs that assure the refuse will move down the grates; and (3) removable grate teeth which permit replacement of worn out grate elements without removal of the entire grate bars. [Det. 2 pp. 3 ill.]

Richards, Glenn C.

642. Burn Brush Without Smoke. *The American City*, 78:9:34, September 1963.

A description of the new $225,000 brush burner used by the city of Detroit, Mich. City trucks haul brush and tree trimmings from streets and parks directly to the burner, and dump their cargoes on a concrete slab by the front door. Logs are dumped and injected into the burner on the other side. The loader operator then opens one of the fire doors by pressing a button in his cab and pushes the debris into the fire. A blade is used on the loader instead of a bucket and extends way out from the frame allowing the operator to push the brush into the fire while keeping the loader away from the flames. The incinerator transforms 1,000 cubic yards of brush into 6 yards of ashes during each 8-hour day. [Gen. 1 p. 2 ill.]

Rogus, Casimir A.

643. Municipal Solid-Waste Disposal—Part III. *The American City*, 77:4:104, April 1962.

A discussion of incineration as a means of refuse disposal. Gives four major disadvantages of incinerating refuse, briefly reviews the basic elements of incineration in its present form, and pinpoints further needed advancements. Includes: plant capacity, refuse-storage facilities, refuse-handling facilities, furnaces, residue-removal system, fly-ash-removal system, and exhaust-gas system. A table compares the cost of construction and operation of continuously fed and batch-fed furnaces. (Continued. See item No. 644.) (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Det. 3 pp. 3 ill. 1 tab.]

644. Municipal Solid-Waste Disposal—Part IV. *The American City*, 77:5:106, May 1962.

A continuation of the discussion of incineration as a means of refuse disposal (see item No. 643). Discusses the control of air pollution from incinerators, waste heat utilization, costs of incinerator construction, and incinerator maintenance. Emphasizes the fact that costlier design, more expensive equipment, and high-grade construction materials, while adding to the original cost, usually give the plant longer useful life and lower operating and maintenance costs; that best performance requires skilled operation and supervision based on meaningful operating data gathered with proper instrumentation; and that maintenance should be both preventive and routine. A table gives the distribution of construction costs. (Reprinted from a report which appeared in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Det. 3 pp. 3 ill. 1 tab.]

645. Refuse Collection and Disposal in Western Europe—Part IV *Public Works*, 93:7:71, July 1962.

A discussion of refuse disposal by incineration in Western Europe. Topics include: (1) development of incineration in Europe; (2) incinerator usage systems—separation and incineration, steam and power generation, intermediate disposal process, and complete incineration; (3) types of modern incinerators; (4) costs; (5) steam and power production; (6) refuse briquettes; and (7) special design items. Tables give incinerator cost data and steam and power production from incineration. The incinerator plants at Berne, Switzerland, Hamburg, Germany, and Saint-Ouen, Paris, France, are diagramed. Refuse incineration is practiced ex-

tensively in Europe and is invariably accompanied by separation and salvaging or by steam and electric generation. The development in the last 3 decades of efficient, highly mechanized, continuous incinerators has resulted in a large number of successful installations. The manufacture of fuel briquettes out of refuse is a promising answer to fuel shortages in Europe. (See items No. 284 for part I, No. 285 for part II, and No. 375 for part III.) [Det. 5½ pp. 1 ill. 3 diag. 2 tab.]

Saburn, A. Walter

646. Twice as Big—Better Than New. *The American City*, 78:2:91, February 1963.

An increase in the quantity of refuse and in the amount of combustibles in the refuse made the 20-year-old incinerator in Darien, Conn., obsolete at the turn of the present decade. City officials decided to modernize the two existing furnaces and enlarge the plant capacity by adding a new furnace. Renovation of the older furnaces included: (1) construction of new larger charging openings; (2) enlargement of flues and gas passages; and (3) replacement of sprung arches with raised flat arches. The new furnace has a capacity of 70 tons per 24 hours. Total cost of the renovation was $300,000, less than half the cost of building a new comparable incinerator. [Det. 2½ pp. 3 ill.]

Schneider, Carl

647. A Modern Incinerator for $2,280 a Ton. *The American City*, 77:9:104, September 1962.

Describes the design and physical features of the new Seventh Street Incinerator in New Orleans, La. The city had only $1 million with which to construct the incinerator, and economies had to be realized in the building portion of the plant. A bid of $775,629 was accepted for the project, and after the purchase of the extra needed items the total cost came to $912,058 or approximately $2,280 per ton. Operation of the new plant has been both satisfactory and economical. A table gives performance and cost data. [Det. 3 pp. 4 ill. 1 tab.]

Skitt, J.

648. Provision in Maintenance of Refuse Disposal Plant. *65th Annual Conference of the Institute of Public Cleansing*, June 17–21, 1963.

Contains some of the items discussed in the author's monograph on the provision and maintenance of the refuse disposal plant (incinerator). Includes these sections: introduction (considerations to be made in the ultimate arrangement of the site and works); the reception hopper; belt conveyors; dust control; furnace; trade refuse incinerators; maintenance; and stores and spares. [Gen. 12 pp. 1 tab.]

Smellie, J. H.

649. The Utilization of Waste Materials for Heat Production. *The Sanitarian*, 70:9:387, June 1962.

Contends that all combustible refuse has calorific value and, if practicable, should be used as a fuel. Discusses the burning of wood waste, types of installations in a successful wood-burning operation, the burning of other wastes, and grit emission. [Det. 8 pp. 5 diag.]

Stenburg, Robert L.

650. Advice on Incineration Disposal of Solid Waste. *Refuse Removal Journal*, 5:12:27, December 1962.

Reprint. (See item No. 651.) [Gen. 2 pp.]

651. Incineration of Community Wastes. *1962 American Public Works Association Yearbook*, p. 212.

Discusses some of the problems involved with incineration, which is becoming more and more widely used as a means of refuse disposal. Incineration can reduce a community's refuse by 80 to 90 percent, but to do the job properly without creating air pollution problems, incinerators must be properly operated in accordance with their design specifications. Public officials should recognize and remedy the problems created through overloading and other improper operating practices. Good management, with competent supervisors and qualified operating personnel, will be necessary to satisfy the overall interests of the community. Better combustion practices and better housekeeping around the plant will do much to remove the objections to incinerators. Improvement will pay off in less air pollution, better public acceptance of incinerators, and greater reduction of refuse volume. (See item No. 650.) [Gen. 3⅔ pp.]

652. Status of the Flue-Fed Incinerator as a Source of Air Pollution. *American Industrial Hygiene Association Journal*, 24:5:505, September–October 1963.

An extensive discussion of the flue-fed incinerator as a source of air pollution. Includes the following: reasons for the outgrowth of flue-fed incinerators; elementary design of the incinerator; its advantages and disadvantages; regulations in New York City, Los Angeles, and San Francisco limiting emissions; factors responsible for air pollution from flue-fed incinerators—design factors, single combustion chamber, tall flues, lack of dampers for draft control, lack of auxiliary heat, inadequate settling chambers, poor operating practices, single large charge and cold chamber, restriction of air supply, quantity and composition of refuse, stoking of fuel bed, charging refuse during burning period, and untrained operators; modifications of flue-fed incinerator design which will permit continued operation of existing systems with reduced emissions—auxiliary fuel, particle separators, air supply control, and auxiliary combustion chambers; a double-flue incinerator; and recommendations—recommended modifications to existing units, recommended design features for new installations, alternative methods of disposal, and need for additional studies. [Det. 12 pp. 4 diag. 16 ref.]

Stenburg, Robert L.; Hangebrauck, Robert P.; von Lehmden, Darryl J.; and Rose, Andrew H., Jr.

653. Field Evaluation of Combustion Air Effects on Atmospheric Emissions From Municipal Incinerators. *Journal of the Air Pollution Control Association*, 12:2:83, February 1962.

Previous laboratory tests have shown that distribution of combustion air in the primary combustion chamber is a major factor affecting the discharge of fly ash and solid particulate matter to the atmosphere. The article describes a sequence of tests made on full scale incinerators to determine the extent to which the relationship between underfire air and particulate emissions applies to incinerators of different sizes and designs. The field studies reported were conducted on two municipal incinerators having rated furnace capacities of 50 tons and 250 tons per 24-hour day. Both units were operated under essentially normal conditions during each test. Separate tests were made at several different levels of underfire combustion air over as wide a range as operating conditions would permit, and solid particulate samples were collected under each test condition for comparison purposes. Experimental procedures and results are given. Results include particulate emissions, oxides of nitrogen emissions, formaldehyde concentrations, carbon monoxide concentrations, hydrocarbon content, and effect of water spray scrubber on the 50-ton plant. [Det. 6½ pp. 2 diag. 3 gr. 4 tab. 4 ref.]

Stern, Arthur C., Editor

654. "Combustion in Furnaces, Incinerators, and Open Fires" (vol. II, ch. 19). *Air Pollution*. Volumes I and II. New York: Academic Press, 1962. 656 pp. and 586 pp.

This chapter, written by Richard B. Engdahl, contains a section on incinerators as a source of air pollution. Types of incinerators discussed include large industrial and municipal, special industrial, domestic, and flue-fed units. Tables give information concerning: concentrations of typical gaseous effluents from single and multiple chamber incinerators with afterburner on and off; comparison of stack emissions from gas-fired domestic incinerators, municipal incinerators, other incinerators, gas- and oil-fired heating units, and automobile exhaust (gaseous emissions, particulate matter, and smoke); emissions from the flue-fed incinerator; and composition of noxious gases from the basic flue-fired incinerator. [Det. 7½ pp. 5 tab. 21 ref.]

TA–3 Incinerator Committee

655. Bibliography on Incineration of Refuse. *Journal of the Air Pollution Control Association*, 12:7:334, July 1962.

A bibliography (not annotated) on the incineration of refuse, prepared for the TA–3 Incinerator Committee by the Engineering Research and Development Section Laboratory of Engineering and Physical Sciences, Division of Air Pollution, U.S. Public Health Service, Department of Health, Education, and Welfare. There are 292 references listed, from the following sources: Library of Congress Bibliography on Air Pollution; San Francisco Bay Area Air Pollution Control District. Uniterm Cards (through June 1960); Engineering Index, 1954–55; Chemical Abstracts, 1945–56; and Air Pollution Control Association Abstracts, January 1957 to October 1960.

Tanner, R.

656. The New Refuse Incinerator of L. von Roll A.-G. *Journal of the Air Pollution Control Association*, 12:6:285, June 1962.

Presents and discusses three conditions under which refuse incinerators must operate: (1) The waste must be burned in an unobjectionable manner; (2) The furnace should be operated under the most hygienic conditions possible; and (3) The furnace should produce the highest possible thermal efficiency. Then describes two of the most important modern European refuse furnaces built and tested by a Swiss firm—the cell-type furnace, and the continuous furnace with gas recirculation. Design of these furnaces and remaining defects in their design are given. [Det. 5½ pp. 6 diag.]

Voelker, Edward M.

657. Incinerator Standards. *Journal of the Air Pollution Control Association*, 12:10:487, October 1962.

A discussion of incineration standards, covering the following subjects: the history of the Incinerator Institute of America, a nonprofit organization of incinerator manufacturers established to collaborate on common problems; several items over which the incinerator manufacturer has no control and to which the architect and engineer should give careful consideration in order to insure a successful incinerator operation; the importance of and extent of acceptance of the Incinerator Standards published by the I.I.A.; two methods for determining the products of combustion from the burning of refuse, and furnace volume incinerator design versus cost; and the ultimate aims of the I.I.A. [Det. 4½ pp. 3 diag. 3 tab.]

L. DISPOSAL—Sanitary Landfill

American Society of Civil Engineers, Committee on Sanitary Engineering Research.

658. A Survey of Sanitary Landfill Practices. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 88:SA3:169, May 1962.

Discussion of the paper entitled, "A Survey of Sanitary Landfill Practices," by the Committee on Sanitary Engineering Research which appeared in the July 1961, issue of the *Journal of the Sanitary Engineering Division*. Replies to the discussions of the paper which appeared in the January 1962.

issue of the *Journal*. Makes comments on the following topics: voids and discrepancies of existing landfill practices; financing of municipal refuse disposal operations; landfill compaction; ground water pollution; the weighing of landfill refuse and the measuring of landfill density; and the future of sanitary landfilling. [Gen. 3 pp.]

Anonymous

659. County Landfill Reclaims Marshlands. *Public Works*, 94:3:117, March 1963.

Describes the operation of the 800-acre, Bergen County, N.J., sanitary landfill. The fill serves 52 communities in the county, representing a population of 600,000. Over 14,000 cubic yards of compacted material are placed in the fill each week. The operation involves a 17-man work force, 2 draglines, 3 track-type tractors, and 1 track-type front end loader. The landfill, which uses a modified trench and cover method, is broken into a dozen individual sites. When a new site is opened, work begins at the existing "hard" road, and as the fill is covered, trucks drive over the former work area, thereby keeping all dumping near the landfill face. Annual budget for the landfill operation is $125,000. [Gen. 1 p. 1 ill.]

660. Coventry Refuse Is Ending Hazard to Planes. *Public Cleansing*, 53:2:68, February 1963.

Domestic refuse from Coventry, England, is now being disposed of in the Baginton Sandpits. Strictly controlled tipping insures that the refuse creates no nuisance for nearby residents. The refuse is tipped in layers 6 feet in depth, is leveled by a bulldozer, and is covered by at least a 9-inch layer of soil. By this method, only a small area of refuse remains exposed at a time and only for a few hours. Landfilling operations at Baginton are beneficial in two respects: the landfill is helping to take the place of the city's incinerator which was recently closed down because of old age; and the hazards to aircraft operating out of a nearby airport due to air turbulence caused by the drop in ground level are being eliminated. [News. 2 pp. 1 ill.]

661. Do You Need A Sanitary Landfill? Public Health Service Publication No. 1012. Washington, D.C.: U.S. Government Printing Office, 1963. 5 pp.

A pamphlet briefly describing the sanitary landfill method of refuse disposal. Gives a definition of the sanitary landfill; emphasizes the need for a complete refuse-handling system in every town; and summarizes methods of landfill operation in low swampy areas, in flat areas and on a slope; equipment needed; and cost. [Gen. 5 pp. 1 ill. 3 diag.]

662. Even Small Landfills Need Big Equipment. *The American City*, 78:6:8, June 1963.

The city of St. Cloud, Fla., found out quickly that heavy equipment would be needed at its sanitary landfill which has been recently converted from an open dump. The city first used a farm-type wheel tractor with bulldozer blade but found that it did not provide sufficient compaction or cover the material properly. [News. ¾ p. 2 ill.]

663. Flexible Container May Prove Useful in Cleansing. *Public Cleansing*, 52:3:122, March 1962.

Describes a rubber-nylon, lightweight, and flexible container which is made in 250-, 500-, and 1,000-gallon capacities. The container was designed for the storage or transport of liquids, and may be applicable to the delivery of water to refuse disposal sites where main water is not available. In addition to its excellent water, fuel, and oil-resistent properties, the container is completely resistant to all climate conditions. The basic design is such that when filled it resembles a pillow, allowing for ease of folding, the use of end seams as anchor points, and a more stable and convenient shape for transport and handling. [Det. 1½ pp.]

664. Golf Course and Recreation Area To Rise From Landfill. *Refuse Removal Journal*, 6:6:20, June 1963.

Westchester County, N.Y., has changed its plans to convert a 504-acre refuse disposal site into an airfield. The county now proposes to build an 18-hole golf course, a swimming beach, and a picnicking ground on the reclaimed swamp land. [News. ⅓ p. 1 ill.]

665. How To Build a Fill. *1963 Sanitation Industry Yearbook*, p. 20.

Describes how to construct and operate a sanitary landfill. Includes: site selection; methods used for landfilling on the side of a hill, on flat land, and on a high, long slope or ravine; and spreading of the cover material. Also discusses sanitary landfill costs. Lists five factors which influence these costs, and breaks down the costs into three categories: land costs; equipment owning and operating costs; and miscellaneous expenditures. [Gen. 2⅔ pp. 2 ill.]

666. Landfill Booming in Pennsylvania Town. *Refuse Removal Journal*, 6:10:24, October 1963.

A progress report on the sanitary landfill in Bethlehem, Pa. In 1962, the landfill work force was cut in half and expenditures were reduced from $45,056 in 1961, to $30,337. The 1963 budget calls for an expenditure of $53,385, but $26,000 of this will be used for the purchase of new heavy equipment. The landfill is a free enterprise and government officials have indicated that the government will not become involved unless the public fails to receive good service at reasonable rates. [News. ½ p.]

667. New Whitecap Air Filtering Helmets To Help Equipment Operators Breathe. *Western City*. 38:2:32, February 1962.

Briefly describes a filtered-air helmet system which can be worn by landfill equipment operators for protection against pollutants and flying objects. The air helmet draws the polluted atmospheric air in through an exclusive filter-blower. The air is then filtered and delivered through a flexible hose to a light-weight, shockproof helmet worn by the operator. The unit provides complete, comfortable protection against all types of dust, dirt, rock, and flying objects for the respiratory system, eyes, throat, head, neck, and face. This has resulted in a reduction of lost man hours, increased machine production, more satisfied personnel, and improved relations between operators and management. By various optional adapters and modified basic configurations, the system can be used also by welders, firefighters, and in other hazardous occupations. [Gen. ⅔ p. 2 ill.]

668. Play Center for 132,000 From Landfill Site. *Refuse Removal Journal*. 6:6:23, June 1963.

The city of Anaheim, Calif., is now using its refuse disposal site as a recreation area. The site, which was filled to capacity by the early 1930's after having been opened in 1901, was leased to private individuals for a rifle range, a riding club, and a storage area, before the city decided to build a recreation center on it in 1958. [News. ⅓ p.]

669. Pollution of Water by Tipped Refuse. *Public Cleansing*. 52:3:116, March 1962.

A summary of a book by the Technical Committee on the Experimental Disposal of House Refuse in Wet and Dry Pits entitled, *Pollution of Water by Tipped Refuse*. In the dry tipping experiment, rainfall was allowed to fall on and percolate through 90 tons of refuse in a tank for a 2½-year period. In the wet tipping experiment, a flow of water was supplied as the refuse was tipped into a tank and conditions created by underground gravel were simulated. In both cases the chemical and bacteriological composition of the percolates were recorded. The percolate during the first year was organically very highly polluting and later became progessively and rapidly weaker. [Gen. 2 pp.]

670. Sanitary Landfill Operations Costs and Revenues. *Public Works*. 93:5:191, May 1962.

The Mount Union, Pa., sanitary landfill was operated for the first full year in 1961, after being converted from an open dump. Expense of operation amounted to $4,837, while revenue derived from the users of the landfill was $4,547. Control of rats and flies has been almost 100 percent effective in the newly converted landfill. [News. ¼ p.]

671. Seven New Jersey Communities Plan Joint Landfill Venture. *Refuse Removal Journal*. 6:12:28, December 1963.

Seven Essex County, N.J., communities are planning to purchase and operate a cooperative sanitary landfill. A committee representing the seven communities is negotiating for a 328-acre site in Bergen County. At present, none of the communities owns its own disposal site, placing them in an inferior bargaining position with area refuse contractors, because the only refuse firms they have been able to contract with are those which have disposal sites. If, on the other hand, the communities operated their own landfill, they could accept bids from many additional contractors and obtain more reasonable collection rates. [News. ½ p.]

672. Successful Landfills Under Big Handicaps. *Refuse Removal Journal*. 5:12:8, December 1962.

Describes how a sanitary landfill company in St. Louis, Mo., successfully filled up a dangerous quarry located inside the grounds of a school and converted it into a baseball field. Several formidable problems had to be overcome: An access road to the quarry had to be constructed; water at the bottom of the quarry had to be pumped out; the level of the fill had to be raised; the landfill operation had to be conducted with no use of daily cover (available dirt had to be saved for the final cover); and approval for establishing a landfill at the site had to be obtained. [Gen. 2⅔ pp. 4 ill.]

673. Suggest Ticket Fee System for Dumping. *Refuse Removal Journal*. 6:8:31, August 1963.

The mayor of Allentown, Pa., has proposed a six-point plan for improving its sanitary landfill operations: (1) halting of all scrap picking; (2) enforcement of regulations prohibiting the disposal of trash on the grounds; (3) adoption of a ticket system for the collection of dumping fees; (4) topographical study for orderly development of land for park and playground purposes; (5) retention of a park consultant to begin layout and plans for a proposed recreational center; and (6) start of construction of actual park lands in that area of the dump where fill operations are considered virtually complete. [News. ⅙ p.]

674. Toronto Shows Successful Use of Landfill. *Refuse Removal Journal*. 5:1:14, January 1962.

Toronto, Canada, is an excellent example of the benefits which may accrue to a community from well conducted sanitary landfill operations. The city has rehabilitated areas devastated by Hurricane Hazel, has created green areas from old swamps and other waste land, and has found a profitable means of disposing of its residents' refuse. In fiscal 1960, revenue from the use of the city landfill by private refuse collectors exceeded the landfill expenditures of the city by nearly $35,000. [News. ¼ p.]

675. Wheels or Tracks? *Public Cleansing*, 53:8:410, August 1963.

A discussion of the relative advantages and disadvantages of the rubber-tired tractor and the crawler tractor as used in the refuse disposal site. Advantages of the rubber-tired tractor include speed of movement, less damage to road surfaces leading to and from the disposal site, maneuverability, and cheaper maintenance. The main disadvantage is the inconvenience caused by continual puncturing of tires. The case for the crawler is equally strong so as to necessitate an individual decision between the two in every case. Many authorities, confined by expense considerations to the use of a single piece of mechanical equipment, have turned to the use of a mechanical shovel in preference to a crawler tractor since the modern shovel meets all the demands of loading operations. [Gen. 1½ pp.]

Austin, Ellis

676. The Death of a Dump. *The American City*, 78:5:29, May 1963.

Tells how the town of Wetumpka, Ala., closed down its dump and established a sanitary landfill operation. The first step in the improvement campaign was to examine the sanitary landfill operation in Ozark 60 miles away. Next a new site was selected, a low-lying occasionally flooded area west of the city. A 52-horsepower tractor with a 1⅛ yard bucket was purchased to work the landfill site. A trench operation with an initial cut of approximately 50 yards long is the method used. [News. ⅔ p. 2 ill.]

Bateman, Peter L. G.

677. Rats. *Public Cleansing*, 52:10:440, October 1962.

Considerable success in the extermination of rats has been achieved with the use of two chemical compounds, sodium fluoracetate and fluoracetamide. On a Part of London Authority refuse tip at Tillbury, England, a few years ago, an intensive treatment with the fluoracetate resulted in a kill of 860 rats in 4 months. Sodium fluoracetate is extremely toxic, however, and many local authorities hesitate to use it. The compound fluoracetamide is safer to use and handle; it is a tasteless and odorless chemical which is just as deadly to rats as the fluoracetate. [News. 1 p.]

Best, Herman E.

678. This Landfill Has Real "Togetherness." *The American City*, 78:2:27, February 1963.

Briefly describes a cooperative sanitary-landfill project between the cities of Maryville and Alcoa, and Blount County, Tenn. Each has a one-third share in the site and equipment being used, and if one of the parties desires to leave the organization, a six-month written notice must be given. [News. ⅔ p. 1 ill.]

Bjornson, Bayard F.; and Bogue, Malen D.

679. Keeping a Sanitary Landfill Sanitary. *Public Health News*, 43:10:316, October 1962.

Reprinted from the September 1961, issue of *Public Works*. (See item No. 504 of the Supplement E bibliography.) Observes that too many communities have adopted the sanitary landfill method in name only, and not in practice. These communities have purchased land and equipment and hired personnel only to find the operation little better than a refuse dump with increased mechanization. When the sanitary landfill deteriorates to an offensive dump, the public may demand its removal. Once this unfortunate and unnecessary setback occurs, the stigma and public resentment remain, and it may never again be possible to obtain convenient sites for economical sanitary landfill operations. The article recommends a plan of action which can be taken to avoid these needless difficulties. Recommendations include: planning the sanitary landfill operation as an engineering project; inauguration of a program of official and public education; selection of the maximum-sized equipment; assignment of only competent, responsible personnel; thorough training of personnel; and setting of high standards of operation. Lists four publications and five films on the sanitary landfill. [Gen. 4½ pp. 1 ref.]

Bowerman, F. R.

680. Clean Air in the Midst of Dust. *The American City*, 77:10:95, October 1962.

Describes the new safety helmet for sanitary landfill operators recently field-tested by the Los Angeles County Sanitation Districts. The helmet is made of fiberglass, with a plastic tilt visor. Air, filtered through a self-cleaning centrifugal-fan filter and a replaceable cellulose fiber-filter, flows into the helmet at a rate of 8½ cubic feet per minute. The helmet can also be equipped with air-conditioning if desired. [Det. 1 p. 2 ill.]

Bronow, John A.

681. U-Blade Dozer Speeds Refuse Handling. *Public Works*, 93:1:82, January 1962.

Briefly describes refuse collection and disposal in Tacoma, Wash., with emphasis upon sanitary landfill operations. Explains charges made to residences and businesses for collection, and lists sources of dump revenues. A U-blade was recently installed on the city's landfill tractor, and it has proved to be more efficient than the straight blade previously used. During landfill operations, less refuse is spilled over the top and around the sides of the U-blade, enabling a full dumped load to be spread in two passes instead of the usual three. [Gen. 1½ pp. 2 ill.]

Burleson, R. A.

682. Landfill for a Wheel Loader. *Public Works*, 93:11:113, November 1962.

Describes the sanitary landfill operations in Grand Prairie, Tex. The city leases its landfill sites from a local sand and gravel company. The fills have predug pits and nearby piles of relatively loose cover material, enabling the city to use a rubber-tired loader rather than a track loader and save on maintenance costs. There has been no tire damage from running over cans and broken glass, because the operator spreads the refuse in such a way that the tires are always on dirt. [Gen. 1 p. 1 ill.]

Eisenberg, Dave

683. A Course Built on Garbage. *Golf Digest*, 14:8:53, August 1963.

In August 1963, Marine Park Golf Course was opened in Brooklyn, N.Y. The unusual feature of the course is that it is built on an 800-acre former refuse disposal site. The golf course takes up only 270 acres of the land reclaimed from New York Harbor, but this area required 6 million cubic yards of refuse which weighed 4 million tons. An estimated $15,300,000 was saved by opening the course on this site. [Gen. 3 pp. 2 ill.]

Hennigan, Robert D.

684. Sanitary Landfill Equipment Requirements. *1963 American Public Works Association Yearbook*, p. 327.

Briefly outlines the refuse situation in New York State—the sanitary code regulations, the practices of refuse collection and disposal, the use of sanitary landfills, the possible types of landfill equipment, the factors affecting selection of equipment, and the equipment used in New York State sanitary landfills. Emphasis is placed upon landfill equipment. Gives eight factors in selecting the equipment, the type of work required from landfill equipment and a description of the new sanitary landfill machine under development. [Gen. 5½ pp.]

Hughes, Leo F.

685. Heavy Equipment Is Key to Landfill-Compaction. *Refuse Removal Journal*, 6:1:6, January 1963.

Describes the operations at a recently opened sanitary landfill site in Fall Township, Pa. The landfill handles all refuse disposal for the cities of Trenton and Lawrence Township, N.J. Owners of the landfill have found it advantageous to use heavy, rather than light, equipment in their operation. The heavy equipment is able to compact refuse more tightly, thereby increasing the life of the fill. The equipment used includes a 50,000-pound rubber-tired tractor shovel and a 46,000-pound track-laying tractor, which combined to get a 90 percent compaction. [Gen. 2⅓ pp. 3 ill.]

Lewis, Charles O.

686. A Sanitary Landfill Goes to School. *The American City*, 77:6:30, June 1962.

The city of Kearney, Nebr., operates a sanitary landfill only a short distance from a new parochial high school without any ill effects. When the site is filled, in approximately 5 years, the city will develop the reclaimed land into a recreational area for the general public and the high school students. [News. ⅔ p. 1 ill.]

McEvilly, William G.

687. Newburgh's Municipal Garage. *The American City*, 77:3:115, March 1962.

Describes the new municipal garage in Newburgh, N.Y. The garage occupies part of the land previously used for the city's sanitary landfill. Building on the landfill posed no unusual problem, however. City officials selected a finished floor grade that would leave the least amount of garbage under the building while still obtaining a subgrade of maximum density. [Gen. 1⅔ pp. 1 ill.]

McSpadden, William

688. Landfill Logistics. *The American City*, 77:1:24, January 1962.

Many advantages have been realized from using a rubber-tired tractor-dozer in the Phoenix, Ariz., sanitary landfill operations. It takes only 45 minutes to transfer the tractor from one city landfill to the other instead of the previous 12 hours it took to transfer a track bulldozer. The rubber-tired unit's output is approximately two times greater on slopes and three times greater on level ground due to its greater speed. It compacts 15 percent more refuse into the same area, and its economical tire wear saves $1 per hour in maintenance over crawler-track wear. [Gen. 1 p. 2 ill.]

Merz, Robert C.; and Stone, Ralph

689. Landfill Settlement Rates. *Public Works*, 93:9:103, September 1962.

Describes a 3-year study of the factors controlling the use of a sanitary landfill site being conducted by the Department of Civil Engineering of the University of Southern California. The purpose of the study is to determine optimum means by which the most waste can be put into the available volume and at the same time permit shrinkage prediction. Six test cells, each 50 feet square by 20 feet deep, have been constructed. The conditions of construction of each cell have been varied, and their influence on the biochemical decomposition of the organic material is being studied. Describes the construction of the cells, refuse and soil characteristics, and settlement in the cells, and gives tentative conclusions reached after the first 22 months of the 36-month study. [Det. 4⅔ pp. 2 diag. 3 tab.]

Michaels, Abraham

690. Municipal Solid-Waste Disposal—Part II. *The American City*, 77:3:92, March 1962.

A complete discussion of sanitary landfilling practices. Includes: (1) a brief history of sanitary landfilling; (2) short descriptions of the area, trench, and ramp landfilling methods; (3) the public health criteria to be met in a sanitary landfill; (4) important factors to consider in fulfilling the criteria such as type and frequency of refuse collection, availability of cover material, access, climate drainage, future site use, and water; and (5) regulations governing private dump and landfills in the Philadelphia, Pa., area. (Reprinted from a report in *Municipal Solid Wastes Disposal, Proceedings of the Third Pittsburgh Sanitary Engineering Conference*, November 4, 1961.) [Det. 3 pp. 2 ill. 5 ref.]

Nichols, Herbert L., Jr.
691. "Refuse Disposal" and "Sanitary Fill" (secs. 10–54 and 10–55). *Moving the Earth*. Greenwich, Conn.: North Castle Books, 1962. 1488 pp.

A section of this book briefly discusses the garbage dump and the sanitary landfill. Includes segregation of refuse, burning, spreading, and the rat, litter, and odor problems at the garbage dump; the dug cell method of sanitary landfilling and covering the fill area. [Gen. 3½ pp. 2 dr.]

Parker, Verne
692. Air-Conditioned for Safety. *The American City*, 77:3:26, March 1962.

Tractor operators at the San Diego, Calif., sanitary landfill sites are now wearing refrigerated protective units, consisting of a centrifugal filter-blower unit and helmet, a refrigeration unit, an electric heater, and a variety of accessory filters for gases, fumes, and smoke. The units are used to protect the workers from respiratory diseases which have plagued previous tractor operators. [News. 1 p. 2 ill.]

Pilgram, Walter
693. Muscatine Successfully Uses In-Town Landfills. *Refuse Removal Journal*, 5:10:10, October 1962.

Describes sanitary landfilling operation within the Muscatine, Iowa, city limits. After a 3-week test with an experimental in-town landfill, residents were convinced that such operations would not create a public nuisance, and at the present there are actually 43 requests to start landfills in the city. The landfill operations are very carefully handled: the garbage and rubbish is rolled down and compacted every day and then covered with a good layer of dirt or sand. Through its in-town sanitary landfill operations, the city is eliminating low mosquito-infested areas, changing them into good potential building sites, and is reducing hauling costs. [Gen. 2¼ pp. 4 ill.]

Requardt, G. J.; and Harrington, W. M., Jr.
694. Use of Incinerator Ash as Cover for Landfills. *Refuse Removal Journal*, 5:11:25, November 1962.

Reprint. (See item No. 695.) [Det. 3¼ pp. 1 tab.]

695. Utilization of Incinerator Ash as Land Fill Cover Material. *1962 American Public Works Association Yearbook*, p. 216.

A report on tests conducted in Baltimore, Md., on the suitability of incinerator ash as cover material for a sanitary landfill. Tests were made on sandy clay, which has already been accepted as a satisfactory cover material, incinerator ash from a 2-year-old stockpile, and incinerator ash from a 10-year-old ash spoil area. The tests include: compaction test (moisture, density relations) by the standard ASSHO test designation T99–57, method D; sieve anaylsis for grain size determination; field moisture content; permeability of a compacted sample; special swell, shrinkage, and moisture-absorption tests using modifications of U.S. Corps of Engineers procedure for analysis for compacted fills; and organic content by loss on ignition. A table summarizes test results. The primary advantage of ash over acceptable sandy clay is its compactability over a broad range of weather conditions. Other advantages of the ash are its greater internal strength after compaction, its freedom from shrinkage upon drying, the greater surface rigidity it affords and the lack of muddiness during rainy weather when it is used. (See item No. 694.) [Det. 9⅓ pp. 2 tab. 3 gr.]

Sanderson, C. W.
696. The Otterspool Land Reclamation Scheme *Public Cleansing*, 52:1:42, January 1962.

Describes two land reclamation schemes—Otterspool scheme, parts 1 and 2—in which valuable, but eroded, land on the foreshore of the Mersey Estuary, has been reclaimed through the filling in with refuse from Liverpool. The first part was begun in 1929. A 1,350-yard river wall was constructed to enclose the proposed tipping area; it was made of mass concrete with precast concrete facing blocks keyed into the main mass of the wall. All of its foundations were carried down to rock level, or an average of 12 feet below the level of the foreshore mud. Tipping was done as construction on the wall proceeded. The wall was completed in 1932, and tipping was continued until 1949, 2½ million tons being dealt with over the 20-year period. The reclaimed land is now used for a pedestrian promenade, park, and recreation area. The saving in refuse disposal costs by this method of disposal, as against incineration, has more than offset the cost of the wall, embankments, drainage outfalls, roads and promenades, park facilities, and landscaping. In the Otterspool scheme, part 2, the river wall was extended 0.9 mile in length for the purpose of enclosing another 70 acres of foreshore and providing tipping space for 4 million additional tons of refuse. A discussion follows the report. [Det. 8 pp. 5 ill.]

Sumner, J.
697. Pollution of Water by Tipped Refuse. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

An introduction to the report of the Technical Committee on the Experimental Disposal of House Refuse in Wet and Dry Pits, entitled "Pollution of Water by Tipped Refuse," published by the Ministry of Housing and Local Government. Discusses the reasons for the experiments, the dry tank experiment, the wet tank experiment, purification of the polluted effluent by filtration, and the general assessment of the experiments. The study was carried out to determine the risk to ground water from refuse tipped in a dry pit where percolate from it could gain access to that water, and the risk when refuse is tipped directly into water communicating with ground water (that is, a wet pit). The main experiments were conducted by tipping refuse into two fairly large open tanks—one dry and one filled with water. Arrangements were made to collect the percolate due to rainfall from the dry tank, and also from the wet tank, where an artificial head was introduced to induce a flow through it similar to what might be found in practice in a wet pit. The committee which prepared this report has indicated that it was difficult to prepare a short technical summary of their conclusions, owing to the complexity of the matter, and has recommended that anyone wishing to use the results should read the report in its entirety. [Gen. 4 pp.]

Vincenz, Jean L.; Mitchell, Desso T.; Winkler, Theodore E.; and Snell, John R.

698. A Survey of Sanitary Landfill Practices. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 88:SA1:43, January 1962.

Discussion of the article entitled, "A Survey of Sanitary Landfill Practices," by the Committee on Sanitary Engineering Research, which appeared in the July 1961, issue of the *Journal of the Sanitary Engineering Division*. Mr. Vincenz raises questions concerning some items of the survey in which it appears that some of the answers tend to distort the facts. The questions concern burning at the landfill and landfill lift depth. Suggests that the data on average distance of haul to the landfill be broken down into cities of various population categories, and comments on the information received regarding acquisition of sites and compaction and density after compaction. Mr. Mitchell comments on the financing of landfill operations, burning at the landfill, public attitudes toward disposal activities, compaction of refuse, and ground water pollution problems. Mr. Winkler briefly discusses the need for a more exacting description of refuse to be handled at the landfill, the ultimate use of the landfill, and future developments and their effects upon this method of refuse disposal. Finally, Mr. Snell discusses ground water pollution, refuse quantity measurements, decomposition of refuse at the landfill, and compares land fill costs with costs of other disposal methods. [Det. 6½ pp.]

Williams, Stanley

699. Landfill Provides Many Services to Community. *Refuse Removal Journal*, 6:8:6, August 1963.

Describes the establishment and operation of Pennsylvania's largest sanitary landfill, which is a privately owned and operated enterprise in Bucks County. The landfill is located between Philadelphia and Trenton, N.J., in a sparsely settled area on marshy swampland. Over the years it has played its part in maintaining good public relations through several public service programs. [Gen. 3⅓ pp. 6 ill.]

Wood, Wilbur

700. Three Inches Are Enough. *The American City*, 77:8:31, August 1962.

By applying a little extra effort to compacting the refuse at the Anderson, Ind., sanitary landfill, only 3 inches of dirt are needed to cover the work area each night. [News. ½ p. 1 ill.]

M. DISPOSAL—Salvaging

Anonymous

701. Built-In System Collects Waste Paper for Bailing. *Modern Sanitation and Building Maintenance*, 14:1:18, January 1962.

Briefly describes the built-in wastepaper salvaging system in a new corrugated box plant in Chicago, Ill. Pickup stations installed in every part of the plant remove trim and waste strips by suction and blow them through a system of air-conveying ducts to a separator on the roof. Scrap can be quickly conveyed to the roof at the rate of 100 pounds per minute. In the baling room, large pieces of scrap board are crushed and torn into smaller pieces. The baler, which is fed by the separator, produces bales 6 feet long and 36 cubic feet in size, weighing nearly 1,000 pounds each. [Gen. ¾ p. 2 ill.]

702. Indentification of Nonsalvageable Paper and Board. *Public Cleansing*, 53:10:478, October 1963.

A major step towards the improved segregation of waste paper was announced by the British Waste Paper Utilization Council. It has been agreed that paper and board containing pernicious contraries will be identified by the letters N.E.P. (not easily pulpable). Mills supplying paper and board to their customers will include the letters N.E.P. on all invoices, labels, and delivery notes where this description applies. This means of identification will be continued by paper merchants to their customers; to complete the operation, printers, box makers, carton makers, and bag makers have been invited to use distinctive N.E.P. labels and tags supplied free of charge to identify their waste arisings. The greatest single advantage of this scheme is its simplicity: it will cost nothing in time, space, or production, and it should make it possible to trace the progress of N.E.P. papers and boards at every stage of their distribution and use. [News. ⅔ p.]

703. Keeping Tabs on the Tab Cards. *Public Cleansing*, 53:6:269, June 1963.

Two new additives—the insoluble plastic or magnetic ink, and the glassine window—have appeared recently on tabulating cards to make them nonpulpable. Neither of these additives can be dispersed by standard cold water repulping processes. Consequently, a valuable source of high quality raw material for board manufacturing (i.e. the tab cards) is being wasted and the nonpulpable cards are proving a menace to mill operations. The British Waste Paper Utilization Council's latest campaign is concentrated on segregating these nonpulpable tab cards from the pulpable cards as a short-term answer to the problem, in lieu of the long-term aim of producing an effective substitute for the additive. [News. 1 p.]

704. LOCAL AUTHORITIES COLLECT 400,000 TONS A YEAR. *Public Cleansing*, 52:8:359, August 1962.

Results of a wastepaper survey carried out recently in Great Britain. Facts uncovered include: (1) 400,000 tons of wastepaper are collected annually by local authorities; (2) 58 percent of this is sold directly to paper mills, and 27 percent to merchants; (3) most local authorities collect wastepaper separate from other waste materials at a rate of once a week; and (4) three-fifths of the authorities collect wastepaper from commercial premises weekly or more frequently, and many make no charge for these collections. [Gen. 1 p.]

705. NOW IT'S VITAL TO SEGREGATE WASTE PAPER. *Public Cleansing*, 52:8:373, August 1962.

With the increasing difficulty in disposing of unsegregated waste paper stocks for repulping, the British Waste Paper Utilization Council is promoting the use of the easily remembered symbol, N.E.P. (not easily pulpable), on invoices and delivery notes for wet strengthened and other specially treated papers which do not readily disintegrate when repulped by standard processes. This scheme should put an end to these papers being passed unchecked through the waste recovery system. [Gen. 1 p.]

706. RUBBISH PROBLEM HITS WEST BERLIN. *Compost Science*, 3:3:48, Autumn 1962.

Oil and other central heating systems and a lack of demand for wastepaper generally make it impossible to get rid of old paper and rubbish in homes and offices in West Berlin. Consequently, these wastes are piling up and creating a real nuisance to the population. Rag and bone dealers, who until a few years ago even paid a little for such things, now have to be begged and persuaded to collect the rubbish. [News. ¼ p.]

707. SCRAP AND SALVAGE. *1963 Sanitation Industry Yearbook*, p. 24.

Briefly discusses how to go about salvaging waste materials and selling them for a profit. Gives a list of typical salvage items, and emphasizes the extreme variation in salvage prices from day to day and from one location to another. Gives definitions of the following scrap items: No. 1 copper; No 1 copper wire; No. 2 copper wire; light copper; No. 1 composition or red brass; brass pipe; mixed unsweated auto radiators; scrap lead—heavy soft; old zinc die cast scrap; old scrap zinc, new zinc clippings; block tin; battery plates; and stainless steel scrap. Tables give: iron and steel scrap prices as of January 2, 1963, in 16 major cities; paper stock prices; prices for cotton rags, bags, new cotton cuttings, new woolen clips and scrap rubber in New York; refiners' buying prices for No. 2 copper scrap in 1962; ferrous scrap prices in three major cities in 1962; mixed wool stock prices; plastic prices; and prices for wiping materials. [Det. 4 pp. 12 tab.]

708. SCRAP GETS THE HEAVE HO!—PNEUMATIC SYSTEM PROVIDES "PUSH" TO SEND PAPER SCRAP TO THE BAILER. *Plant Engineering*, 17:6:128, June 1963.

This Dayton, Ohio, publishing corporation generates 110 tons of paper scrap daily—45 percent of which is "trim" scrap from bindery machines, 35 percent "signature" scrap, and 20 percent wastepaper from the presses. A new scrap-handling system has been installed in the plant, featuring a venturi injector for the bulky signature scrap. With such a system, a fan is placed behind the material inlet. The main piping is constricted at this inlet and expanded again immediately following it. This transition serves to create a subatmosphere condition—a powerful suction force—at the inlet. The system was put through 2 weeks of rigorous testing and worked beyond expectations. [Gen. 1 p. 1 ill. 1 diag.]

709. SUNDERLAND GETS NEW TIN BAILING PRESS. *Pubtic Cleansing*, 52:4:148, April 1962.

Briefly describes a new tin-baling press installed at the disposal works in Sunderland, England. The baler box is 42 inches by 21 inches by 11 inches, giving a capacity of 5.6 cubic feet before compression. The final bale size is 11 inches by 11 inches by a variable length, and it has been found that, with this variable at 8 inches, average bale weights are between 45 and 50 pounds. The baler is charged by gravity from an overhead hopper. When this box is full, shearing blades shear off any overspill, thereby eliminating hand trimming. The purchase price of the baler is comparable with other hydraulic balers, and it can be installed in a floor area of 42 square feet. [Gen. 2½ pp. 2 ill.]

710. SYNTHETIC ADHESIVES ON PAPER. *Public Cleansing*, 53:4:180, April 1963.

Results obtained with modified polyvinyl acetate emulsions have raised hopes of a breakthrough in the development of pulpable synthetic adhesives—an important project in the campaign to safeguard supplies of valuable wastepaper. In laboratory tests the commercial range of pva compounds sampled conformed to the needs of the standard cold-water pulping process; the polyvinyl adhesive coatings separated quickly from paper and left no spots or windows on the surface of remade sheets. This means that unless snags arise at production level an effective replacement for nonpulpable adhesives is at last within reach. [Gen. 1½ pp.]

711. A Trailer To Solve the Salvage Problem. *Public Cleansing*, 53:3:148, March 1963.

Salvage paper is becoming a major problem for the majority of councils throughout Great Britain with the advent of smokeless zones, central heating, and electric fires. The article describes one solution to the problem—a 5-cubic-yard salvage trailer. The vehicle is heavy duty, but with finger tip balance control which eliminates any difficulty in hand maneuvering. It can be accommodated with any prime moving fleet of vehicles, and to accommodate rear-loading parent vehicles a powerful long reach draw bar is supplied. An optional, automatic hand-control lever is extremely useful for manhandling the trailer to tips or conveyors. The powerful ramp tailboard can be used for loading and unloading. [News. ⅔ p.]

712. Waste Collection Cost Cut by Portable Baler. *Refuse Removal Journal*, 6:9:30, September 1963.

A Ventura, Calif., salvage company is using a large, portable corrugated baling machine to reduce costs of refuse salvaging. The baler, which can be operated by one man, is towed behind a flat-bed truck as it makes its rounds of markets, industrial and bottling plants, and other producers of large quantities of waste. [Gen. 1¼ pp. 2 ill.]

713. Wastepaper Merchant's Sales Steady. *Public Cleansing*, 53:4:173, April 1963.

Wastepaper sales at the end of November 1963, showed an increase of 137,979 tons of which 109,155 tons consisted of the lower grades. Stocks of wastepaper held by the paper and board mills was the lowest since July 1961. The overall weekly average consumption of wastepaper during November 1963, indicated that the upward trend in consumption has been maintained While it was difficult to say whether there was any real improvement in the wastepaper industry, there seemed to be a more optimistic feeling among merchants. [News. ½ p.]

714. Wastepaper Baling Presses. *Public Cleansing*, 52:2:78, February 1962.

Describes a line of wastepaper baling presses designed in the United States and manufactured in Great Britain. The balers are of advanced horizontal closed chambers design and can be supplied either for manual feed or completely fitted with electronic controls and filling chute for automatic feed. Special features of the balers include its exceptional mobility (it can be moved by one man) and its safety and simplicity of design. [Gen. 1¼ pp.]

Bunting, Charles

715. 110 Tons of Paper Scrap Handled 40 Percent More Efficiently. *Air Engineering*, 5:3:17, March 1963.

One of the world's largest printing plants solves its paper scrap handling problem with the use of a unique injector type air conveying system which transports the scrap from presses to baling building. The Dayton, Ohio, plant generates 36,000 tons of scrap paper per year, although the waste factor is relatively small—only 5 percent of all paper handled at the plant. The article describes the sources of the scrap paper, the old equipment used prior to the new conveying system, the new venturi-injector installed for transporting signature and trim scrap from the presses to the balers, the balancing of the air conveyor system, and the method used for preventing the clinging of the wastepaper. The entire pneumatic scrap handling system comprises five component systems—four handling trim scrap, and the fifth handling signature scrap. [Det. 2½ pp. 3 ill.]

Hawker, T. G.

716. Magnetic Extraction. *Public Cleansing*, 53:4:160, April 1963.

A brief discussion of the various types of equipment used in composting and incineration plants for the magnetic extraction of ferrous materials. The device generally used is an overland extractor, which is suspended across the main picking belt and lifts ferrous materials out of the refuse discharging it at the side of the belt in readiness for baling. The main magnet unit can be provided with an auxiliary unit of opposite polarity causing the extracted tins to gyrate and release entrapped refuse. An automatic a.-c. controller can be incorporated in the overload circuit of the driving motor to correct possible jammings. If a jam occurs, the electrical supplies to the motor and magnet units are interrupted, releasing the piece of iron. In composting plants where elimination of all ferrous materials is essential, magnetic pullup can be used at the head of the picking belt as an addition to the overland extractor. [Gen. 2 pp. 2 ill.]

Jackson, D. W.

717. The Economics of Waste Paper Recovery. *64th Annual Conference of the Institute of Public Cleansing*, June 4–8, 1962.

A complete discussion of wastepaper salvaging and the economics involved. Includes: historical background, giving the ups and downs of wastepaper salvage activities from 1936 to the present; effect on refuse collection and disposal; wastepaper salvaging by the local authority, with emphasis upon the requirement that salvaging should be at best profit-earning and at least creating no expense for the authority; trends in wastepaper production and consumption; collection methods—separate trade collection, separate domestic collection, and collection with refuse; handling methods—reception, sorting, grading, baling, storage, and loading; bonus schemes; expenditures on, and incomes from wastepaper salvaging in a number of municipalities in Great Britain; application of this gathered data to the economics of wastepaper salvage operations in a hypothetical industrial town of 120,000 and comparison of findings of the hypothetical situation with actual results. Concludes that wastepaper salvaging can be run on an economic basis provided due regard is given to all the facts enumerated in this paper. [Det. 23 pp. 9 ill. 3 tab.]

Lipsett, Charles H.

718. *Industrial Wastes and Salvage.* New York: Atlas Publishing Co., 1963. 406 pp.

This book is intended to give the reader a general knowledge of the production and utilization of waste materials. Acquaints the reader with the principal scrap and waste materials produced and consumed by industries, with their sources of supply, how and by whom they are produced, how they are bought and sold, and how they are handled and processed so that they are again suitable for use in making other commodities. The book is divided into three sections: a commodity section, dealing with all the various scrap materials and wastes which are generated; a salvage section, describing the salvage programs of various companies, the department store, New York City and municipalities in general, and automobile, ship, and railroad wreckers; and a specification section, giving specifications for wool stock, cotton rags, wiping cloths, scrap rubber, iron and steel scrap, alloy scrap, nonferrous scrap, metals, and paper stock. [Det. 406 pp. 16 tab.]

Mumby, Kay

719. Mechanical Handling. *Public Cleansing.* 53:2:90, February 1963.

Discusses mechanical handling of scrap metal. The material falls into two main categories: the waste produced as a result of engineering processes; and scrap made up of capital goods that have been discarded, including the widely dissimilar objects found among domestic and industrial refuse. The nonferrous and ferrous metals must be separated, and the ferrous materials must be sorted into various grades of cast iron and steel in the handling processes. The graded material must then be reduced to convenient dimensions and weights before loading into the furnaces. [Gen. 2 pp.]

Randles, Lyle C., Jr.

720. The Field of Refuse Salvage. *Compost Science.* 4:2:5, Summer 1963.

Contends that practically all waste is salvageable or potentially useful, and that there should be no problem in recovering most of the waste in the United States. Discusses the salvage potential of garbage, dead animals, composting, paper and cloth, metals, and noncombustible rubbish. [Det. 6 pp. 3 ill. 1 tab.]

Sanders, Neil H.

721. They Even Sell the Ashes. *Public Works.* 94:8:99, August 1963.

Describes the salvage shop of the city of Memphis (Tenn.) Light, Gas, and Water Division, including the following equipment in the shop: a light-bulb crusher for salvaging the brass ends of street light bulbs; a gas-fired incinerator for salvaging copper from wires and cables; and wire strippers for reclaiming aluminum wire. The salvage shop netted $105,525 from its salvage operations during the fiscal year ending October 31, 1962. [Gen. 1 p. 5 ill.]

722. We Even Sell the Ashes! *Gas Age.* 130:9:28, September 1963.

Describes the activities of the salvage shop of the Memphis, Tenn., Light, Gas, and Water Division. During the fiscal year ended October 31, 1962, the salvage shop netted $105,525 from its salvage operations. Included in the salvage shop are: a light-bulb crusher, which devoured 89,000 street light bulbs in the last fiscal year and salvaged the brass ends of the bulbs; a gas-fired incinerator which salvages the lead and copper from coils of insulated copper wire, lengths of lead-coated underground cable, and leaded copper connections. (The furnace ashes are also salvaged and sold for the little bits of copper wire and oxide they contain); and wire strippers which remove insulation and steel cores from aluminum wire. [Det. 2 pp. 5 ill.]

N. DISPOSAL—Radioactive Wastes

Abrams, C. S.; Hahn, W. J.; and La Pointe, J. R.

723. Performance of the Radioactive Waste Disposal System at the Shippingport Station. *Chemical Engineering Progress.* 58:1:70, January 1962.

A basic principle of this radioactive waste disposal system is the segregation of wastes to take full advantage of the particular capabilities of several disposal processes. The waste treatment processes used in the Shippingport, Pa., plant include: natural decay of the radioactive constituents; ion exchange to remove the radioactive constituents; dilution in the turbine condenser effluent stream; separation of radioactive material from waste water by a standard evaporation process; retaining certain solid wastes at the plant site in underground storage tanks; incineration of certain solid wastes; and packaging of wastes for land burial. The article describes disposal of combustible and noncombustible solid radioactive wastes, among other wastes. [Det. 9 pp. 2 ill. 1 diag. 4 gr.]

Anonymous

724. Incinerator Handles Radioactive Wastes. *Chemical and Engineering News.* 40:49:54, December 3, 1962.

The Bureau of Mines has developed an incinerator for disposing of solid, combustible wastes containing low-level radioactivity. The incinerator can handle about 30 pounds of rubbish and sawdust per hour using 100 percent overfire air and a negative pressure during operation. The solid residue, mostly ash, that results from incineration is one-twentieth to one-tenth the volume of the original waste. It is therefore better suited to ultimate disposal by burial or other means. The article describes the operation and design of the incinerator. [Gen. 1 p. 1 ill.]

725. Industry's First Land-Waste-Burial Facility Begins Operation. *Nucleonics*, 20:11:22, November 1962.

Describes the first privately owned and operated land-radioactive-waste-burial facility in the United States, which went into service in October 1962, following amendment of the company's sea-burial license to permit land disposal by the Atomic Energy Commission. The facility is located on an 80-acre site in the Amargosa Desert near Beatty, Nev. Costs to bury the liquid and solid wastes are expected to be one-half to one-third the cost of the sea-burial method. The waste is buried in boxes or barrels in trenches 12 to 20 feet deep, according to safety standards established jointly by the disposal company and the A.E.C. Approximately 65,000 cubic feet of solids and 100,000 gallons of liquids were expected to be buried in 1962. Waste treatment equipment at Beatty, includes two concrete mixers used for solidifying liquids, remote-handling machines, and extensive instrumentation. Transportation of wastes from customer to the disposal area is a key aspect of the disposal company's service. Six drivers, two tractor trailers, and one 2,600-gallon tank truck are used for transportation. All the drivers are well drilled in safety procedures and each vehicle is equipped with radiation-monitoring instruments and equipment for use in case of accident. Along with the company's emphasis on safety in burial operations is the natural safety of the Beatty site. The geology at Beatty is perfect for nuclear-waste disposal. [Det. 2 pp. 3 ill.]

726. What To do With the Waste. *Time*, 79:2:13, January 12, 1962.

Briefly surveys the problem of disposal of radioactive wastes in the United States. There are over 6,000 government and private institutions generating radioactive waste material. In the past 6 years, the total amount of land-buried radioactive waste in the Atomic Energy Commission's main burial grounds has increased almost four-fold. Twelve private firms are now licensed by the A.E.C. to transport and dump much of the low level radioactive wastes. Originally most of the waste was mixed with concrete, packed into 55-gallon drums, and dumped at sea; since 1946 over 44,000 drums have been dumped into the ocean. But this means of disposal is expensive—$10 to $12 per cubic foot, as compared to $0.70 per cubic foot for the burial of low-level wastes. Inevitably, a few accidents have occurred, and the A.E.C. has come up against protests and legal actions in its radioactive waste handling activities. [News. ⅔ p. 1 ill.]

Hottenstein, E. R.

727. The Disposal of Radioactive Waste. *Mechanical Engineering*, 84:9:60, September 1962.

Describes the processing and disposal of gaseous, liquid, and solid radioactive waste at a nuclear power site in Pennsylvania. Nonvolatiles (or solid wastes) are separated from liquid wastes by an evaporator. The nonvolatiles concentrate in the evaporator, are periodically withdrawn, and are placed in 55-gallon steel drums, suitably shielded, for either sea disposal or offsite shipment to an Atomic Energy Commission burial site. [Det. 4 pp. 4 ill. 1 diag.]

Mawson, C. A.

728. Nuclear Waste Management in Canada. *Journal of the Water Pollution Control Federation*, 35:8:1055, August 1963.

This discussion of radioactive waste management in Canada covers the following: disposal in the soil; disposal in the sewer system; Canadian regulations concerning waste disposal; Canadian procedures in radioactive waste disposal—sewer disposal and ground disposal; some general methods suitable for small users of radioactive materials; and operations at Chalk River, the site of Canada's major source of radioactive waste. [Det. 10½ pp. 6 ill. 3 diag. 1 map. 2 ref.]

Morgan, James M., Jr.; Geyer, John C.; and Costello, David C.

729. Land Burial of Solid Packaged Radioactive Wastes. *Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division*, 88:SA3:139, May 1962.

A thorough study of the land burial of solid packaged radioactive wastes in the United States. Includes the following: purpose of land burial; major land burial areas in the United States; early disposal practices and burial areas; small burial and storage locations; burial at plant of origin versus offsite burial; conditions under which burial at plant of origin is permitted; proposed burial grounds and storage mine; source of the radioactive wastes; type of wastes anticipated; levels of activity of the wastes; definition of low hazard potential; handling techniques; typical shipping containers for land-burial disposal; transportation and shipment of radioactive wastes; selection of burial unit; burial site description; geographical distribution of shippers; the Division of Production Coordination; and quantity of waste buried. [Det. 22½ pp. 1 diag. 1 map. 8 tab. 39 ref.]

National Research Council, Committee on Oceanography

730. Disposal of Low-Level Radioactive Waste Into Pacific Coastal Waters. National Academy of Sciences—National Research Council Publication No. 985. Washington, D.C.: National Academy of Sciences—National Research Council, 1962. 87 pp.

The purpose of this study was to ascertain by what means and in what amounts it is feasible to dispose of radioactive material in the ocean off the West Coast of North America without curtailing the present and future use and enjoyment of the resources of the region. The report includes the following: general considerations of the sea as a resource for the disposal of atomic wastes—the sea as a resource, interrelationships of sea disposal of atomic waste and other marine resources, geology, physical oceanography, biology, commercial fisheries, sport fisheries, and other resources; allowable levels of radioistopes in sea water—the specific-activity approach, preparation of table presenting recommended Maximum Permissible Concentration of various radioisotopes in sea water, and relation of MPCC with other ingestive hazards; allowable methods and rates of radioactive waste disposal off the Pacific coast—MPCC for practical disposal of sea water, possible disposal zones, transportation, jettison, descent, impact, residence, the environment and environmental changes, leakage, permeation, and uptake, dilution of radioisotopes and disposal rates, number of disposal areas, and spacing of disposal sites; examination of assumptions, recommended control, monitoring, investigation and research; recommendations and summary; and appendices regarding equations, uncontained disposal on the surface, comments on present disposal areas and allowable levels of disposal, instrumentation, the environmental improvement program, and comparison of the recommendations with other recommendations and reports. [Tech. 87 pp. 7 tab.]

Stevens, James I.; and McBride, J. A.

731. What Can We Do With Radioactive Waste? *Mechanical Engineering*, 84:12:46, December 1962.

Examines in general the problem of radioactive waste disposal. Includes the following: future quantity of radioactive wastes; character of the waste; commercial utilization of fission products; the need for ultimate disposal methods; disposal in the oceans, disposal in land masses; disposal methods under development; storage of solid wastes; other methods; and costs. [Gen. 4 pp. 11 ref.]

O. STREET CLEANING

Alvey, Leo

732. We Needed A Better Way. *The American City*, 77:4:41, April 1962.

The city of St. Louis, Mo., has found that truck-mounted, hydraulic, front-end loaders save time and manpower in its street cleaning operations. Piles of debris dumped by the mechanical sweepers must be hand-loaded into dump trucks to be transported to the disposal area, and the front-end loaders help in this hand-loading operation. Each unit can service several dump locations and keep from two to five sweepers working full time with only one driver and one laborer per unit. [News. ½ p. 1 ill.]

Anonymous

733. Another Use for Paper Sacks. *Public Cleansing*, 52:4:176, April 1962.

The paper sack has now invaded the realm of street cleaning as an alternative to the galvanized bin on street-cleaning carts. The town of Maidstone, England, has introduced three-ply wet strength paper sacks in its street sweeping operations. Each street sweeper gets six or more sacks at a time, and as they are filled he leaves them in suitable places for the pickup vehicle, which later returns the sacks for reuse. Average life of a paper sack is 8 days of continuous use. [News. 1 p. 1 ill.]

734. Cleaning Underground Railway Tracks. *Public Cleansing*, 53:8:393, August 1963.

Describes the nature of the refuse which accumulates along a rail system and the methods used to collect this refuse in London, England; Stockholm, Sweden; New York City, N.Y., and Chicago, Ill. In London engineers have experimented with an air jet and suction system and electric magnet devices to collect railway refuse, but to no avail. The London Transport Board still employs hand cleaning methods. The city of Stockholm has developed a special vacuum cleaning unit consisting of two rail cars—a pickup car, and a collector car. The New York City Transit Authority has had an American firm develop vacuum cleaning equipment which is probably now in use by the Authority. In Chicago, a much simpler portable cleaning unit which is moved between subway stations is being used at the present time. [Gen. 5 pp. 4 ill.]

735. Cleaning Up After World Fair Crowds. *Public Works*, 93:9:138, September 1962.

The city of Seattle, Wash., uses an efficient pavement sweeper for keeping pavements neat and clean for the thousands of World's Fair visitors. A powerful combination of vacuum and air power airsweeps a path 6½ feet wide, collecting dust, dirt, and litter. [News. ⅓ p. 1 ill.]

736. Cleanup Drive Nets Record Load. *Refuse Removal Journal*, 6:7:14, July 1963.

The recent annual 1-month cleanup campaign in Lubbock, Tex., netted over 28,178 cubic yards of rubbish. This was the largest volume ever collected for this type of campaign in the city. The heavy load was attributed to severe cold freezes during the winter which damaged trees and shrubs. During the campaign the refuse trucks worked the regular 4-day operation plus overtime on Saturday. [News. ⅓ p.]

737. Four Times as Costly; Six Times Greater Service. *The American City*, 78:5:44, May 1963.

The city of Minneapolis, Minn., has discovered that it is more economical to use polypropylene brushes than African bass brushes for street cleaning. Although the polypropylene is considerably more expensive ($1.25 per pound) than the African bass ($0.28 per pound), it lasts six times longer, and huge labor savings are realized. Results of the past sweeping season have shown that the bass fiber broom costs $0.19 per mile swept in contrast to the polypropylene brooms, costing $0.12 per mile swept. [News. ¾ p. 1 ill.]

738. GN Installs Fast, New Car-Cleaning System. *Railway Age*. 152:4:21, January 29, 1962.

Describes a new pushbutton boxcar cleaning system being used in Grand Forks, N. Dak., components of the $120,000 facility include a vacuum, dual cyclone dust collector, pulverizer, two 12-cubic yard refuse containers, and conveyor equipment. Seventy to ninety cars are processed every 8-hour shift, 5 days a week, by a 5-man crew. [Gen. 1 p. 3 ill.]

739. Harbor Debris Problem Yields to Winch Crane. *Refuse Removal Journal*. 6:3:24, March 1963.

Describes the method previously used for cleaning up debris in the Long Beach, Calif., harbor and the new method recently adopted after installation of a winch crane. Harbor cleaning was previously accomplished through hand operations from a pick-up barge. Injuries and turnover were high from this back-breaking work, and there were few applications for the job. Now, a single deck-hand operates the winch crane, picking up debris safely and easily. [Gen. 1 p. 2 ill.]

740. Harbor Housecleaning By Boat. *The American City*. 78:12:148, December 1963.

The port of Milwaukee, Wis., is the first Great Lakes port to undertake a systematic harbor-cleaning program. To accomplish this task, a small boat, the Harbor Seagull, is used. From April 4 to December 31, 1962, the boat delivered 23 tons of floating debris and dead fish to a dockside incinerator and collected 32 5-ton truckloads of debris too large for incineration. Special equipment on the boat includes a 2-ton lifting boom with one-man hydraulic controls, a 500 gallons per-minute pump and fire nozzle having a 250-foot range, a specially designed purse sieve net, and two removable self-draining trays. [Gen. 1 p. 2 ill.]

741. Industrial Equipment. *Public Cleansing*. 52:2:64, February 1962.

Briefly describes some of the industrial equipment which appeared at an exhibition at the City Hall, Deansgate, Manchester, England. Includes a small mechanical suction sweeper and a portable baler. Some of the features of the sweeper are its ability to operate in confined spaces, and its usefulness. When a suction hose is attached as a static tool for drawing dust from the base of conveyor belts, the chambers housing containers in multistory flats, and other natural points of accumulation. The baler is capable of producing bales of paper, textiles, metals, and fibrous material. It would be useful at any tip where salvage is dealt with, or as a stand-by machine in larger installations in event of breakdown of the major press unit. [Gen. 3⅓ pp. 1 ill.]

742. Man or Machine? *Public Cleansing*. 52:9:403, September 1962.

Reviews a paper by Mr. E. Austin, Director of Cleansing, Grimsby, England, comparing manual and mechanized street cleaning. Emphasizes the inability of municipalities to attract young laborers for street cleaning, and contends that this service could be made more attractive by substituting mechanical sweepers for the brush and shovel. Presents findings that indicate mechanical sweeping reduces costs—with manual sweeping, an average of 1.243 miles can be swept daily at a cost of 37.2 shillings per mile, compared to 10.09 miles at a cost of 19.7 shillings for mechanical sweeping. Also compares costs of removal of the sweepings. Discussion follows the review. [Gen. 6⅓ pp.]

743. Mobile Bins. *Public Cleansing*. 52:11:487, November 1962.

A new method of manual street sweeping is being tested by the County Borough of Merthy Tydfill, Wales. This district is a hilly one, and there have been many complaints from the sweepers that the work was too heavy in pushing the orderly bins up steep inclines. In the new system, strategic points on the sweepers' rounds have been gauged where they would have full bins and at these points empty bins are available to put onto carts. At the end of the day, a refuse collection truck collects the contents of the bins and deposits the waste at the refuse disposal site. [Gen. 2 pp.]

744. New Loader-Mounted Hydraulic Sweeper. *Refuse Removal Journal*. 6:3:20, March 1963.

Describes a new loader-mounted hydraulic-drive pickup sweeper recently marketed by a New Holstein, Wis., manufacturer. The new sweeper is available for all popular-make tractor loaders, and it is claimed that the sweeper can be attached or removed in 10 minutes after the original installation. A special feature of the sweeper is its forward dumping action, especially important when emptying the hopper into truck bodies. [News. ⅔ p. 1 ill.]

745. New Unit Designed for Beach Cleaning. *Refuse Removal Journal*. 6:4:35, April 1963.

Describes a recently developed beach cleaning machine. The machine sifts trash sized from 0.22 to 5 inches in diameter and up to 3 feet long out of more than 400 tons of sand per hour. A hydraulic lift on the trash basket dumps trash directly into a truck with no rehandling. [News. ½ p. 1 ill.]

746. Power on the Streets. *Canadian Municipal Utilities*. 101:7:61, July 1963.

The borough of Baldwin, Pa., is using a 4-cubic-yard power sweeper to conduct a regular, preventive cleaning program which has reduced storm-sewer clogging emergencies by 70 percent. The entire 70-odd miles of paved streets, half of them curbed, are now swept at least once every 2 weeks. Usually beginning in March, the sweeper operator moves out in the wake of winter snows, cleaning up sand, cinders, gravel, grass, and other debris.

By getting streets cleaned before rains can wash this material into storm sewers, the problem of clogging is greatly reduced. The sweeper is a conveyor type with front-steer design to afford maximum safety and adequate maneuverability. A spray system with sectional control and a 275-gallon water tank give efficient dust and dirt control during sweeping. [Gen. 1 p.]

747. Record 3,474 Tons of Paper Showered Down for Astronaut Glenn. *Public Cleansing*. 52:8:370, August 1962.

Reprint. (See item No. 772.) [News. 1½ pp. 1 ill.]

748. Recorder Clears Up an Unfair Complaint. *Public Cleansing*. 52:3:132, March 1962.

The city of El Paso, Tex., recently purchased two mechanical sweepers on which they installed recorders to keep track of each day's work. Three months later, a citizen complained that one of the sweepers had been parked at a certain intersection for well over an hour. Inspection of the recorder's chart, however, cleared the sweeper operator by proving the complaint false. [News. ½ p.]

749. 16-Unit Fleet Keeps Catch Basins Clean. *The American City*. 78:8:36, August 1963.

The city of Philadelphia, Pa., uses a fleet of 16 mechanical catch-basin cleaners to service more than 100,000 basins in the city. Although some of the very old basins still must be cleaned by hand, mechanical equipment is used whenever possible to keep costs down. The machines carry both clam-shell and orange-peel buckets which are interchangeable to fit the various basins. The operation involves three men—the cleaner operator, a truck driver, and one laborer; along with the cleaner and one dump truck. Each machine cleans an average of 35 basins per day. [News. ½ p. 1 ill.]

750. A Stronger Leaf Rake. *The American City*. 78:3:28, March 1963.

Briefly describes leaf removal in Fresno, Calif. During most of the year street-sweeping operations proceed according to a fairly regular schedule, but in autumn the leaves require special equipment and special schedules. The city has developed a leaf rake attached to a mechanical street sweeper and reinforced on the wings to give it greater stability. Four of these units are used, along with a truck-mounted front-end loader for leaf collection and removal. [News. ⅔ p. 2 ill.]

751. Thames Gets A "Dustcart." *Public Cleansing*. 52:3:132, March 1962.

The Port of London Authority will soon launch a campaign to clean up the rubbish in the Thames River. An ex-Army landing craft will be converted into the river's chief "dustcart." [News. ½ p.]

Bard, F. A.

752. A Small Unit for an Important Job. *The American City*. 77:7:32, July 1962.

Palmer, Nebr., cleans its six blocks of hard-surfaced streets with a small sweeper pulled by a tractor. The unit has a 1¼-yard hopper, a 9-horsepower, air-cooled gasoline engine for broom power, a 7-foot broom, and a water tank for the elimination of dust. Cleaning the city's street by hand was too expensive, and a large, self-powered sweeper was too big for the job, so a local machinist was requested to assemble the pull-type unit. [News. ½ p. 1 ill.]

Carozza, M. J.

753. Employees' Suggestions Cut Sweeping Costs. *Public Works*. 94:5:137, May 1963.

The Fresno, Calif., Public Works Department recently opened up its street-sweeping program to comments and suggestions for improvement from supervisors and employees. The men responded admirably, making many helpful suggestions. Eight such suggestions are listed. After putting them into effect, the city has been able to increase gutter miles swept per shift from 18 to 33 and cut costs from $4.68 to $3.00 per gutter mile. [Gen. 1 p. 1 ill.]

754. Employees' Suggestions Cut Sweeping Costs. *Western City*. 39:2:33, February 1963.

In 1958 the city of Fresno, Calif., changed from a commission form of government to a council-manager. The public works department then undertook a major reorganization and subjected the street sweeping program, among others, to extensive study and revision. It soon became evident that sweeping routes were overlapping or widely scattered and were out of date. Supervisors and operators gathered together into "think sessions." These meetings were thrown open for comments, and the operators responded admirably with thoughtful ideas and suggestions such as: change in timing; rearrangement of shifts; rearrangement of route patterns; increasing equipment efficiency; and revision of machine maintenance responsibility. Comparing the statistics of sweeping operations before and after reorganizattion: 18 gutter miles swept per shift in 1959 to 33 today; cost of $4.68 per gutter mile in 1959 to $3 in 1962. Another benefit has been in flexibility of the routes. [Gen. 1 p. 2 ill.]

Dyment, Robert

755. "Alert Orange" Increases Safety of Public Works Fleet. *Public Works*. 93:1:125, January 1962.

An "Alert Orange" color is being applied to sweepers, flushers, front end loaders, and other city-owned vehicles in Rochester, Pa., to increase visibility and reduce accident rates. The new orange has increased night visibility by as much as 500 feet, and accident rates among the repainted vehicles have dropped in comparison to the accident rates of equipment still finished in the old battleship gray. [News. ⅔ p. 1 ill.]

Eggleston, Jack
756. From Bitter Cold To Blistering Heat. *The American City*, 77:10:34, October 1962.

The city of Cedar Rapids, Iowa, uses its new front-mounted sweeper not only for cleaning accumulations of dirt from sidewalks and parking lots in summer months, but also for removing light snow from bridge walks, and sidewalks during the wintertime. [News. ½ p. 1 ill.]

English, Raymond P.
757. Dirty Streets Have No Place in Our "Cleanest City." *The American City*, 78:5:93, May 1963.

Describes street cleaning operations and antilitter gimmicks used in East Orange, N.J. The city, which has won several "Cleanest City" awards in the past several years, employs two full-time sweepers, and one part-time sweeper and a bucket loader to clean its 79 miles of streets. Although successful, the city's street cleaning program needs two improvements: a better preventive-maintenance schedule; and a device which automatically adjusts for a 5-inch mainbroom pattern. [Gen. 3 pp. 5 ill.]

Essen, Thomas W.
758. We Flush and Sweep for Better Results. *The American City*, 78:8:36, August 1963.

Describes street cleaning operations in Palm Springs, Calif. Very fine white desert sand causes the major problem in keeping city streets clean. The city has a flushing operation preceding the mechanical sweepers to wash the entire street surface and carry the fine sand along with the heavier dirt to the curbs. This permits the sweepers to make only one gutter pass, thus saving time and broom material. The city recently changed from Palmyra fiber to Danline wire on main brooms and has reduced costs from $0.365 per mile swept to $0.274. [News. ½ p.]

Ford, Al
759. Main Brooms for 9 Cents A Mile. *The American City*, 77:6:32, June 1962.

The city of Glendora, Calif., has found many advantages to using polypropylene bristles in its sweeper brooms: the bristles last several times longer than other fibers, cost only 9¼ cents per sweeping mile, reduce sweeper downtime for broom rebuilding, require no wetting-down before use, and resist breakage, oil, grease, acids, and alkalis often contacted by sweepers. [News. ⅔ p. 2 ill.]

Galloway, James L.
760. Nylon Bristles Halve Broom Costs. *The American City*, 77:4:41, April 1962.

Test results on three different sweeper brooms indicate that the nylon brooms will sweep 7,000 miles at a unit cost of 6.3 cents, hickory 333 miles at 12 cents, and steel 3,000 miles at 7.3 cents. Park Ridge, Ill., a community which sweeps from 6,000 to 7,000 curb miles per year, can therefore use one nylon broom for a full year, saving not only on broom expenditures, but also in the cost of changing brooms and resulting downtime. [News. ½ p. 1 tab.]

Haley, James W., and O'Leary, Timothy J.
761. Plastic Fiber on an Annual Contract *The American City*, 78:11:29, November 1963.

This year for the first time all of Boston's 30 mechanical sweepers used plastic instead of natural fiber in the main brooms. The long-lasting plastic has proved less costly per sweeping mile than the palmyra brooms in tests conducted comparing the brooms. [News. ⅓ p.]

Hoppe, Fred
762. The Cost of Collecting Leaves. *The American City*, 77:11:93, November 1962.

Discusses leaf-collecting operations and costs in Wauwatosa, Wis. Leaf collection includes two separate operations: picking up piles of leaves from the street, and cleaning the leaves from the parkway areas. The city has installed a scale at the disposal point to weigh each truckload of leaves before it is dumped on the compost pile. During the two leaf-collection months of 1962, the city disposed of 4,027,160 pounds of leaves at a cost of $20,653.79 or $10.26 per ton. [Gen. 1 p. 2 ill.]

Horton, John P.
763. The Street-Cleaning Revolution—Part I. *The American City*, 78:3:106, March 1963.

Briefly comments on the early days of street sweeping and traces the development of street-cleaning brushes. Discusses the three major varieties of pickup broom construction: cable-wrapped, or spiral-wound; replaceable strip; and disposable sections, or wafers. (See item No. 764 for part II.) [Gen. 3 pp. 5 ill. 9 ref.]

764. The Street-Cleaning Revolution—Part II. *The American City*, 78:4:104, April 1963.

Describes the revolution which is presently taking place in street-sweeping brushes. For many years, natural fibers—palmyra, African bass, hickory fiber, and split bamboo—have been used for broom-filling material, and many sweepers still use these fibers. But it has been found through experimentation that although the natural fibers are initially less expensive than the plastic fibers, they have a considerably shorter life span. The plastic brooms—nylon, polypropylene, and polystyrene—have thus been found to be more economical. Wire brushes have also come into use in municipal street-sweeping operations in recent years. The article compares the different types of synthetic (or plastic) filaments, and the relative availability and efficacy of the natural fiber, plastic, and wire brooms. (See item No. 763 for Part I.) [Det. 2⅔ pp. 1 ill. 2 tab. 7 ref.]

Jarboe, Robert E.

765. Dust-Free Sweeping at the Zoo. *The American City*, 77:3:35, March 1962.

A power sweeper is used to clean the many miles of streets, sidewalks, and parking lots in the San Diego, Calif., zoo. The sweeper with its vacuum action, is dust-free, permitting sweeping anywhere at any time of the day, and its turning radius of 6¼ feet provides the maneuverability necessary to follow the footpaths. [News. ½ p. 1 ill.]

Kaupert, Walter

766. Germany's Airborne Dust Collection. *The American City*, 77:7:32, July 1962.

A very brief description of street cleaning in Germany touching upon types of sweepers used, ways in which the problem of parked cars is handled, and the dual night-and-day shifts of the sweeping fleet. [News. ½ p. 1 ill.]

King, Lowell

767. Two Keys to Cleaner Streets. *The American City*, 77:3:35, March 1962.

Owatonna, Minn., replaced its small 1½-yard sweeper with a new 4-yard sweeper and realized many advantages in its street cleaning operations, such as cleaner streets, fewer trips to the disposal area, reduced cost per sweeping mile, and elimination of the followup crew. The city also replaced palmyra brooms with Danline wire brooms which last 20 times longer. [News. ½ p. 1 ill.]

Lucia, Frank J.

768. A Tree Sheds in Brooklyn. *The American City*, 77:12:14, December 1962.

Briefly describes New York City's "Operation Leaf Loader," in which approximately 250 men and 150 pieces of equipment are used to collect an estimated 67,000 tons of leaves. During the period of the operation, refuse-collection regulations relax somewhat and allow householders to dispose of leaves in any secure container instead of covered garbage cans. [News. ⅓ p.]

Manning, C. P.

769. Municipal Power Sweeping From A to Z. *1962 American Public Works Association Yearbook*, p. 266.

A general discussion of past, present, and future street cleaning equipment. In Benjamin Franklin's time, street cleaning was done with brooms. In 1906 Alexander Young ushered in the era of the mechanical sweeper with his invention that revolutionized the concept of municipal street sanitation. Today, many cities are realizing their responsibilities for overall municipal housekeeping, and they are employing power sweepers to clean dozens of public places. Experimentation is now being done on the use of the ground effects machine that will destroy debris by short wave ultrasonic sound and remove the particles by drawing them into the air intake parts of the air system used to support and propel the sweeper. With the expansion of the municipal housekeeping concept, there will be many career opportunities for those in the field of municipal sanitation. (See Item No. 770.) [Gen. 5 pp. 6 ill.]

770. Power Sweeping History Shows Great Progress. *Refuse Removal Journal*, 6:2:10, February 1963.

Reprint. (See item No. 769.) [Gen. 1⅔ pp. 1 ill.]

McElwee, W. D.

771. Street Cleaning Gets Assembly-Line Techniques. *The American City*, 78:6:126, June 1963.

Describes a new system for the removal of street sweepings developed in Sioux City, Iowa. The system utilizes an over-the-cab compaction truck and removable sweeper hoppers. When a sweeper accumulates a full load, the sweeper operator discharges the entire dirt-filled container onto the street. The compaction truck grabs the container, elevates it over the cab and dumps the load into its 18-cubic-yard body. The empty hopper is then replaced in the sweeper. The compaction truck is able to serve 4 sweepers without difficulty and can hold the contents from as many as eighteen 3-cubic-yard hoppers before making a trip to the disposal site. In spring and fall, when street dirt and leaves become major problems, the compaction truck is supplemented by two hoist trucks that carry the individual containers to the landfill. Under the new system 7 men and 1 compactor can do the same job which was previously accomplished by 12 men and 4 dump trucks. In other changes in street sweeping practices, the city has replaced African bass with plastic broom fiber in its sweepers and has reduced downtime to one-tenth of the previous amount. [Gen. 2 pp. 5 ill.]

Miller, John L.

772. Consider the Sanitation Man When It's Time for Heroes. *Sweep*, 4:1:3, Spring 1962.

The reception which Lt. Col. John H. Glenn, Jr., American astronaut, received in New York City was the city's biggest welcome, judging by the 3,474 tons of confetti, streamers, and torn paper collected after the parade by municipal sanitation forces. The city used 200 refuse collection trucks, 100 mechanical brooms, 50 flushing trucks, and 3 vacuum leaf collectors to clean the streets and gather up the parade refuse, which was immediately taken to 3 city incinerators. (See item No. 747.) [News. 1½ pp. 1 ill.]

Olson, George B.

773. For Any Type of Surface. *The American City*, 77:10:34, October 1962.

City officials in Belmont, Mass., have found that polypropylene bristles perform better than any other broom filler for the varied types of street-cleaning situations encountered. The new fiber has excellent resistance to flexing and to the effects of grease and other chemicals sometimes encountered in the course of the work. It shows surprisingly little wear and lasts several times longer than other broom fillers. [News. ½ p. 1 ill.]

Orton, J. W.

774. Machine Loading and Removal of Leaves. *1962 American Public Works Association Yearbook*, p. 286.

Describes briefly the history of leaf removal and developments in machine loading and removal of leaves from city streets. The first vacuum leaf machine was introduced in 1939. This machine, with a motor and suction fan, picked up leaves, mulched them with the fan, and blew them into a truck. Nine years later a completely self-contained vacuum leaf collector was introduced, which had a suction fan picking up the leaves, mulching them, and depositing them in its own hopper. In 1951 came the design of a completely vacuumized machine which picked up leaves by vacuum suction and carried them through hoses to airtight hoppers without mulching. Many variations of this design have since been produced. Within the past 2 years a new machine has been developed for the bulk removal of leaves. In it, vacuum suction is combined with a hammermill mulching action. [Det. 2⅓ pp.]

Paris, Ben R.

775. Just One Pass With Two Engines. *The American City*, 77:5:102, May 1962.

Twin-engine sweepers have reduced the cost of street cleaning in Los Angeles, Calif. The new units incorporate two engines—one to propel the vehicle, and the other to propel the brooms; thus, when the unit slows down, the brooms no longer slow down with it, but can be kept at a constant speed. The one-engined sweepers often need several passes when large dust accumulations are encountered, but the twin-engined vehicles can clean all amounts of debris with one pass for this reason. A table gives average annual sweeper costs in Los Angeles for 1961. [Det. 2½ pp. 3 ill. 1 tab.]

Payne, R. Howard

776. Choosing A Pickup Broom Filler. *Public Works*, 93:4:114, April 1962.

Describes a study undertaken several years ago by a large corporation to examine variables controlling the performance of a street sweeper pickup broom in order to obtain fundamental data necessary to design and produce optimum filling material. Includes a listing of sweeping variables, describes equipment and procedures used in the tests, and gives results and conclusions. Two points of paramount importance were found from the tests: (1) sweeping performance of a pickup broom does not depend upon the chemical composition of the filler but upon its stiffness; and (2) the wear rate of a pickup broom depends upon both chemical composition and stiffness of the filler. Results of these tests are helpful in selecting the most economical filler for sweeping operations. [Det. 3 pp. 3 ill. 1 table. 1 gr.]

Richmann, William A.

777. Street Sanitation and the Sweeper.—Part I. *Refuse Removal Journal*, 6:4:26, April 1963. From Mr. Richmann's book, *The Sweep of Time*.

A lengthy description of the rise of the concept of street sanitation, in relation to the era of urbanization and mechanization of the late 19th and early 20th century America. With the growth of large population centers and development of the automobile, a civic awareness of unsanitary and disease-creating conditions developed. Municipal government and leagues of women throughout the United States worked to make conditions sanitary in the urban centers. Describes how Col. George E. Waring, Jr., appointed Street Commissioner of New York City in 1895, provided the leadership in the campaign toward the improvement of the sanitary aspects of the Nation's streets. Among Waring's accomplishments were pioneering in modern home sewage systems and establishment of the "White Wing" Sanitation Force and juvenile leagues in New York City. (See items No. 778 for part II, No. 779 for part III, and No. 780 for part IV.) [Gen. 3½ pp.]

778. The March of Progress in Street Sanitation. Part II. *Refuse Removal Journal*, 6:5:20, May 1963. From Mr. Richmann's book, *The Sweep of Time*.

A continuation of a report on the history and development of street sanitation. (See items No. 777 for part I, and No. 779 for part III, and No. 780 for part IV.) Describes the observations of George E. Waring, Jr., Street Commissioner of New York City, on his tour of sanitation operations in Europe in the 1890's. Waring found that the important difference between New York City and European cities was the lack of enforcement of the New York Sanitation ordinances. Also discusses: the first attempts of mechanized street cleaning with the use of horse-drawn rotary brooms, work gangs, and sprinkling wagons, and the drawbacks of this system; the use of street flushers to settle dust and the disadvantages of this operation; the development and operation of the squeegee machine; and the development of the mechanical sweeper—from the horse-drawn machine in Manchester England, in 1843 to the first gasoline-powered sweeper which appeared in the United States in 1911. [Gen. 3¼ pp.]

779. Murphy's Machine Changed Street Cleaning. Part III. *Refuse Removal Journal*, 6:6:10, June 1963. From Mr. Richmann's book, *The Sweep of Time*.

Tells about the development of the first gasoline-engined mechanical street sweeper by John M. Murphy, who originated the idea and worked in cooperation with a tower and tank manufacturing company in Elgin, Ill., to produce the machine. The sweeper was first put into operation in 1913 in Boise, Idaho. (See items No. 777 for Part I, and No. 778 for part II, and No. 780 for Part IV.) [Gen. 2⅓ pp. 2 ill.]

780. Will Vacuum or Sound Operate Tomorrow's Street Cleaning Equipment—Part IV. *Refuse Removal Journal*, 6:7:16, July 1963. From Mr. Richmann's book, *The Sweep of Time*.

Describes the development and distribution of the first gasoline-engined mechanical street sweeper. Also discusses the probable future of street cleaning efforts. (See items No. 777 for part I, No. 778 for part II, and No. 779 for part III.) [Gen. 3¼ pp. 2 ill.]

Smallwood, David M.; and Michaels, Abraham

781. The Clean-Street Bug is Catching. *The American City*, 78:9:98, September 1963.

Describes the development of the clean-block program in Philadelphia, Pa. When the program got underway in 1953, there were 15 clean blocks organized; today there are over 1,800 registered with the city. The program is primarily a self-help, self-sustaining venture; the only help received by the citizens from the city consists of posting "no-parking" signs during the cleanup periods, visiting the blocks on cleanup days to be available if needed, and providing a collection service for refuse accumulated and flushes and mechanical sweepers to assist in cleaning the extremely dirty streets. [Gen. 2½ pp. 6 ill.]

Stokely, James A.

782. The Sweepers are Part of the Parade. *The American City*, 78:9:36, September 1963.

Describes the postparade cleanup operation in Phoenix, Ariz. The city has found that 10 mechanical sweepers, 1 loader truck, and 2 pickup trucks following immediately after the last entry of the parade can pick up virtually all litter the parade generates with only one pass and much more quickly than the cleanup system previously used. Police motorcycle officers stay with the sweepers from beginning to end to prevent the parade watchers from interferring with the cleanup operations. Inspectors in radio-equipped vehicles stationed along the route coodinate the entire operation. In addition to the motor sweepers, there is a small squad of men stationed every few blocks to clean sidewalks and parkways. [Gen. 1 p. 1 ill.]

Thelin, C. M.

783. Hand Sweeping Loses. *The American City*, 78:7:20, July 1963.

The city of Fort Worth, Tex., recently replaced eight white wings with three power sweepers in its downtown business district. The white wings were each paid $12.50 daily, while the sweeper operators receive $13.15 per day and sweeper fuel and maintenance costs are approximately $39 per month. [News. ½ p. 1 ill.]

Thompson, C. W.; and Boeke, C. A.

784. Don't Hedge on Street Sanitation. *The American City*, 77:12:69, December 1962.

Describes the street sanitation program in Middletown, Ohio, listing personnel and equipment used. Street-sweeping is done by both machine sweepers and white wings. A dump truck equipped with a front-end loader picks up both machine and hand sweepings, and material deposited in sidewalk trash containers, and then disposes of the waste in the city landfill. Three major problems which the city faces are: long-term parking, downtime of sweepers, and leaf removal. Municipal officials have found that plastic prefabricated sweeper brooms last much longer than hickory brooms and require much less time to install on the sweepers. [Det. 2 pp. 3 ill.]

Webster, Leonard F.

785. Raising a Little Dust. *Canadian Municipal Utilities*, 101:2:13, February 1963.

Gives very brief reports on the street cleaning situation in each of the communities of the metropolitan Toronto area. Includes: metropolitan Toronto; the city of Toronto; the towns of Leaside, Mimico, New Toronto, Weston; the villages of Forest Hill, Long Branch, Swansea; and the townships of East York, Etobicoke, York, North York, and Scarborough. Tables give the following information: population per sweeper, curb miles per sweeper, population per cubic yard of sweeping capacity, and curb miles per cubic yard of sweeping capacity (for each of the communities listed above); recommended sweeping patterns for the various types of brush material; recommended quantities of synthetic materials per broom; and population, acreage, assessment, road and curb miles, number, make, and capacity of sweepers, hours worked, frequency of sweeping, average sweeping speed, life, mat, and cost of gutter broom, how brooms are remade, and how refuse is disposed of (for each of the communities). Also gives lowdown on broom filling material—tynex, palymyra stalks, danline, keystrand, dendex, prostran, split bamboo, hickory splints, herox, flat steel wire (for gutter brooms), and oil-treated calabar bass fibre. [Det. 8½ pp. 12 ill. 3 tab.]

Wilcox, Floyd F.

786. Keep the Drop on Falling Leaves. *The American City*, 78:1:82, January 1963.

Describes leaf collection in Lynbrook, N.Y. The city employs one five-man crew equipped with a new leaf-collecting unit and two 11-cubic-yard dump trucks, one three-man crew with another, less efficient leaf collector and one dump truck, one four-man crew using a front-end loader and one dump truck, and one or two three-man crews that hand load leaves into regular packer refuse trucks. [Gen. 2 pp. 5 ill.]

Williams, George; and Hodges, A. T.

787. Stretching the Street Dollar. *The American City*, 78:10:102, October 1963.

Briefly describes street cleaning in Lawrence, Kans. Two recent developments have been responsible for cleaner streets and greater efficiency in sweeping: the city has received permission from four lot owners, one in each section of the city, to dump street sweepings on their vacant lots, thereby eliminating the trips to the landfill; and a new, 4-cubic-yard sweeper is being used to clean the streets. Parking bans on the downtown streets are used to aid in the sweeping operations. City officials have switched entirely to plastic broom fiber because it is more economical. [Gen. 2 pp. 4 ill.]

P. LITTER

Anderson, J. Robert (Editor)

788. Keep Virginia Beautiful. *Virginia Health Bulletin*, 16:1:2, May 1963.

The entire bulletin is devoted to the litter and refuse problem in Virginia. Includes: factors contributing to the increase in littering; cost of littering to the public (in terms of dollars, deaths, and health menace); refuse as litter; the recent Virginia State Health Department Survey of the total refuse handling problem; efforts in Henry County, Va., to solve the refuse and litter problem; the program of the Keep Virginia Beautiful organization; other antilitter activities; the use of litter bags; and the individual's responsibility in the litter problem. [Det. 9 pp. 4 ill. 1 map.]

Anonymous

789. Angeleno Trucks Proclaim Cost of Littering. *Refuse Removal Journal*, 6:6:19, June 1963.

All 365 of the Los Angeles, Calif., refuse collection trucks sport posters which declare, "It Costs $4 Million a Year to Pick up After Litterbugs." The city hopes that this will make the litterbugs realize that they are wasting their own money when they throw things in the street, in the parks, and on the beaches. [News. ⅙ p.]

790. Antilitter Group in Seashore Drive. *Refuse Removal Journal*, 6:11:27, November 1963.

Keep America Beautiful, Inc., has turned its attention to the Nation's waterways. With the growing popularity of boating, fishing, swimming, and waterskiing, the "water litterbug" has sprung up to contaminate swimming areas and fishing streams. Litter discarded by the water litterbugs is of two kinds—the floating type, and the sinking type. Keep America Beautiful, Inc., in cooperation with private sports clubs, State and Federal conservation officials, and other government agencies, is housecleaning waterways and educating the litterbugs who have created the problem. [News. ¼ p.]

791. Australians Demand Antilitter Campaign. *Refuse Remove Journal*, 6:9:42, September 1963.

Because of excessive littering of streets, empty lots, and city park lands, citizens of Canberra, Australia, have appealed to the Department of Interior to support an antilitter campaign, consisting of: placing of litter baskets throughout the city; provision of information on antilitter campaigns in other countries; an appeal to petroleum companies to provide litter bags for motorists; education of public through lectures, school shows, and pamphlets; and contests for antilitter slogans and posters. [News. ⅛ p.]

792. Better Disposal Key to Litter, Study Asserts. *Refuse Removal Journal*, 5:3:27, March 1962.

An antiquated disposal system was cited as one of the major causes of littering in a report presented at a meeting of the National Advisory Council of Keep America Beautiful, Inc. To date, the Institute has conducted 417 interviews in Vermont, Maryland, and Michigan on the litter problem, and consumers indicate that the amount of litter to be seen is almost proportional to the quality of the trash collection system which the community provides. It was also reported that some emphasis is placed on the role of certain large groups in creating litter, such as small business establishments which often sweep debris from the stores out into the street gutters. [News. ½ p.]

793. Chicago Installs Colored Plastic Refuse Baskets. *Refuse Removal Journal*, 6:9:49, September 1963.

The city of Chicago, Ill., is replacing old rusty metal refuse baskets with new 40-gallon copolymer plastic containers. The new baskets come in eight different colors, and city officials are considering a plan to change colors with the seasons. The plastic containers weigh only 15 pounds, are immune to rust and corrosion, eliminate the need for steam cleaning and refinishing, and regain their shape when crushed or bent. [News. ½ p.]

794. Councils Blamed for Dumping. *Public Cleansing*, 52:8:364, August 1962.

After receiving many complaints about large, discarded items littering the area, the Leeds and Lower Dales branch of the Council for the Preservation of Rural England, conducted a survey of councils covered by the branch. It was found that all councils provided for the collection of items other than normal household refuse, but that their reluctance to advertise the special service was an important factor in the spread of the litter. [Gen. 2 pp.]

795. Every Litter Bit Helped in Neighborhood Cleanup Drives. *Sweep*, 4:3:11, Autumn 1962.

Describes some of the neighborhood cleanup drives which, along with the efforts of the newly organized Sanitation "Flying Squad" and a New York City advertising agency, are helping to keep the city clean. For example, neighborhood children in upper Manhattan manned brooms and hoses and scrubbed down sidewalks along 159th Street. These youngsters took their cue from another civic-minded group of Manhattan children who earlier had urged Broadway storekeepers to keep their storefronts and sidewalks clean. In Harlem, "clean-city spotters" searched for neighborhood people who went out of their way to help keep the city clean and issued clean-city citations to them. [News. 1½ pp. 1 ill.]

796. A First for Plastics: Molded PE Litter Basket. *Modern Plastics*, 40:10:85, June 1963.

Discusses the ethylene copolymer litter basket, and compares this new type of litter basket with the standard, galvanized expanded metal litter basket. The all-plastic containers offer these advantages: they are much less costly, lighter in weight, and considerably more attractive; they nest more compactly, require less storage space, are not easily bent or crushed; and they do not develop loose or jagged edges which might cause injury or damage clothing. The article compares the all-plastic and metal litter baskets in these areas: weight, handling, color, cost, fire hazards, toughness, low temperature, resistance, display, and stability. [Det. 1⅓ pp. 1 ill. 1 tab.]

797. Glasgow Parents Blamed for Litter. *Public Cleansing*, 52:4:170, April 1962.

In his annual report for 1960–61, the Director of Public Cleansing, Glasgow, Scotland, blamed parents for not reprimanding their children when they upset refuse bins and caused a litter problem while playing in the city's back courts. [News. 1 p. 1 dr.]

798. Helicopter Aids Fight on Litter. *Refuse Removal Journal*, 5:7:29, July 1962.

The helicopter is regarded as a powerful weapon in the State of New Jersey's continuing war against litter and pollution on the beaches and adjacent waters, as well as an added means of assuring safe boating. The helicopter with pilot is now being leased on a trial basis. It will usually fly at 500 feet, patrolling each weekend and major holiday, in addition to providing spot inspection. The helicopter is equipped with air-to-ground communications, a public address system, and a camera to facilitate apprehension of any litterbugs. [News. ¼ p.]

799. Litter Control Month Gets Support of San Francisco City Departments. *Western City*, 39:8:37, August 1953.

Describes the litter control program in San Francisco, Calif. The philosophy behind the successful litter control campaigns is that the easiest way to clean up litter in the streets is to get help from the people who put it there. Costs of keeping the area clean approximate $2.5 million annually, and the more litter prevention help the city receives from the public, the lower these costs will be. The month of May has been designated as Litter Control Month in San Francisco. Each annual Litter Control Campaign is initiated with a parade, and continues with major events of general interest and special neighborhood projects. In the annual neighborhood sweepup, scrubup project, one or two neighborhood areas in the city are singled out for special attention. Neighborhood crews consisting of merchants and residents and aided by a city street sweeper do the cleaning up. In conjunction with the Litter Control program, 450 litter pole baskets have been installed, with the city contemplating an eventual total installation of 2,500 baskets. [News. ½ p. 2 ill.]

800. Litterbugs Get Summonses in Cleanup Drive. *Refuse Removal Journal*, 6:8:18, August 1963.

The New York City Department of Sanitation has issued 10,800 summonses since the special campaign against litterbugs started. After 15 percent of the enforcement staff was reassigned to night duty, summonses issued to nocturnal litterers increased to 10 percent of the total summonses and there was an immediate reduction in nocturnal littering. The night enforcement drive is a part of the city's annual cleanup campaign efforts. Other activities in the campaign include addition of 10,000 new litter baskets, assignment of over 50 trucks for bulk refuse collection, a drive against defective trash containers, and a hoped-for increase of 250 men in the refuse collection staff. [News. ⅓ p.]

801. Little Vehicle—Big Job. *The American City*, 77:6:32, June 1962.

In Minneapolis, Minn., little three-wheeled vehicles pick up litter in downtown shopping areas. These vehicles, each operated by one man, have replaced trucks with two-man crews and have eliminated the traffic bottlenecks caused by the trucks in addition to reducing the labor force needed for the job. When filled to capacity small litter collectors empty their loads into one of the larger collection vehicles at the city garage. [News. ½ p. 1 ill.]

802. Lively Louie. *The American City*, 78:11:29, November 1963.

Lively Louie, a talking litter basket, is an outgrowth of the continuing clean-city program established in New York City by Mayor Wagner in 1956. Louie was made from a metal swing-top litter receptacle equipped with a two-way sound system. Personnel of the sanitary education unit of the Department of Sanitation provide the voice, stationing themselves so that they can observe what goes on around the exhibit and thus make use of incidents in their conversations with passers-by. [News. ½ p. 1 ill.]

803. **Miami Cleanup Rated a Success.** *Refuse Removal Journal*, 5:1:14, January 1962.

Success of a recent Operation Cleanup in Miami, Fla., has prompted the city to consider establishment of semiannual cleanup programs. In the operation, the city was divided up into sections, and residents were informed by handbills, radio and television, and the press when collection crews would be in their areas to pick up items not normally collected in the regular service. Cranes equipped with clamshell buckets, 80 trucks, and 200 employees took part in the cleanup drive, which netted 4,714 tons of refuse. [News. ¼ p. 1 ill.]

804. **More "Flying-Squad" Litter Patrols.** *The American City*, 77:9:28, September 1962.

The "Flying Squad" of the New York City Sanitation Department has been increased from 40 to 100 patrolmen. The squad, mounted on motor scooters and in prowl cars and a bus, has been enforcing the health code in badly littered parts of the city to the extent of issuing 16,000 summonses in a 2-month period. [News. ⅓ p.]

805. **Motorist Litter Clogs Highways.** *Refuse Removal Journal*, 6:6:14, June 1963.

Antilitter laws and warning signs haven't made a dent in the litter problem along highways, waterways, and in State parks in New Jersey. Everything from beer cans to mattresses and refrigerators are thrown away on public lands. Chances are the big-time litterbug is incorrigible, but there are a good many amateurs who could kick the habit by keeping a paper bag trash receptacle in their car. [News. ⅙ p.]

806. **New York's Department Tries 'Litter Scooter.'** *Refuse Removal Journal*, 5:8:10, August 1962.

Describes the new litter scooter being tested in New York City. The new machine can cover up to seven to eight times as much ground as manual sweepers. It holds over 1 cubic yard of litter, 10 times as much as dirt cans now in use, but is compact and maneuverable. The scooter weighs only 800 pounds; gas consumption is 60 miles per gallon; the motor is 7.5 horsepower; and maximum speed is 36 to 38 miles per hour. [Gen. 1¼ pp. 1 ill.]

807. **$135,676 Worth of Pari-Mutuel Tickets Found in Rubbish at New Jersey Tracks in 1962.** *Refuse Removal Journal*, 6:7:14, July 1963.

Briefly discusses antilitter laws in New Jersey. Over $135,000 worth of uncashed tickets were found among the tons of refuse generated at four New Jersey race tracks. The highest fines for littering fall on the boat and auto categories—$1,000 or a year in jail or both. To decrease littering in State parks, the New Jersey Conservation Department is charging an admission fee and has refurbished thousands of old oil barrels for litter containers. If a truck is caught spilling its contents, a $50 fine or 15 days in jail results. [News. ½ p.]

808. **Philadelphia Has Unique Plan for Fighting Litter.** *Refuse Removal Journal*, 5:8:24, August 1962.

The city of Philadelphia, Pa., has put into practice a unique plan to aid the fight against litter. The city streets department has announced that it will purchase one litter basket for every two purchased by any community within its jurisdiction, and the city basket will be for that particular community's use. Furthermore, the city will install all baskets at its own expense at locations designated by the community, and will thereafter service and maintain all the baskets. [News. ⅔ p. 1 ill.]

809. **Philadelphia Neighborhood Fights Litter.** *Refuse Removal Journal*, 5:4:25, April 1962.

Civic pride, backed by decisive action, has resulted in the installation of 28 pole-mounted litter baskets in the Spruce Hill section of Philadelphia, Pa. The Spruce Hill Community Association combined its funds with the city streets department's funds to finance the project. [News. ½ p. 1 ill.]

810. **Saying It With Flowers.** *Public Cleansing*, 53:2:75, February 1963.

A well-known manufacturer of garden seats and furniture and litter baskets has recently marketed a flower basket in teak which stands on three feet that fit into the top of litter baskets, leaving sufficient space for rubbish to be put in the bin. The device will draw attention to the litter basket and at the same time will make its appearance more attractive. [News. 1 p. 1 ill.]

811. **Spring Cleanup Costs Cut 28 Percent.** *The American City*, 78:8:27, August 1963.

Two factors were responsible for the 28 percent cost reduction in the 1963 Middletown, Ohio, spring cleanup campaign: cooperation from residents in setting discarded material at the curb the night before collections were due; and closer supervision by the city obtained through coordination of trucks, collection routes, and schedules. The program required 1,180 man-hours and 624 hours of equipment usage and cost $3,152. [News. ¼ p.]

812. **Wrappings—The Trappings of Litter.** *Public Cleansing*, 53:4:187, April 1963.

Discusses briefly the litter problem in several countries of the world. Wealth, advancing ideas in hygiene, and high-pressure salesmanship have contributed to the litter problem through the rapidly expanding packaging industry. The United States seems to have the worst litter problem of all, due to its highly affluent society, craze for packaging, and dense population. Great Britian is next on the list, followed by the French. At the top of the list, in virtue, are the Swedes; they are affluent and packaging conscious, but the population density is small and the people have a strong northern character of tidiness. [Gen. 1¼ pp.]

Lucia, Frank J.

813. If It Works in New York City—Part I. *The American City*, 78:12:96, December 1963.

Describes the work of the New York City Sanitation Department and citizen's committees in attempting to keep city streets and sidewalks free from litter and refuse. Discusses some of the unique features of New York City which add to the litter problem. The city employs a community relations officer with a staff of 35 people to ascertain and analyze opinions of the department's services to prepare and distribute releases, reports, and speeches to the mass communication media, and to plan and conduct a program of sanitary education. The interdepartmental committee for a clean city includes the heads of 28 city departments and public authorities, agencies which collectively make general inspections, ferret out offenses and offenders, and conduct an educational campaign. The sanitation department has a large group of inspectors who are empowered to issue summonses and make arrests. Recently blitz tactics have been used by equipping inspectors with scooters and patrol cars. There is a "Citizens' Committee to Keep New York City Clean, Inc.," led by prominent citizens. Finally, there is a program to eventually place over 60,000 litter baskets and public ash trays in all areas of heavy pedestrian traffic. [Gen. 2½ pp. 3 ill.]

814. Testing a Compact Litter Scooter. *The American City*, 77:11:25, November 1962.

Briefly describes the new, motorized, three-wheeled litter scooter which is on trial in New York City. The scooter, which holds over 1 cubic yard of litter, can cover seven to eight times more area in a comparable period than the familiar "white wing" and can carrier. It has a 7.5-horsepower motor, weighs 800 pounds, has a maximum speed of 36 to 38 miles per hour, and costs $950. [News. ½ p. 1 ill.]

Sumbardo, David J.

815. South San Francisco's Cleanup Campaign Receives Honor In National Competition. *Western City*, 39:10:32, October 1963.

Describes the second annual "Cleanup—Paintup—Fixup—Plantup" campaign in South San Francisco, Calif. Many clubs, businesses, institutions, and private individuals participated in the program, which was so successful that it won the city national recognition. [Gen. 1 p. 2 ill.]

Webb, N. Conant

816. Ready Receptacles—Less Litter. *The American City*, 77:5:27, May 1962.

Describes some of the ways in which the city of Montclair, N.J., is attempting to keep its streets litter-free: a "Keep Montclair Beautiful" committee, comprised of private citizens; the repairing and repainting of litter baskets; and increase in the number of litter receptacles; a "Cleanup, Paintup, Fixup Week"; a request to residents to refrain from placing yard litter and leaves in the gutters; and regular mechanical sweeping program. [News. ⅔ p. 1 ill.]

Wolff, Michael

817. Where The Litter Comes From. *Public Cleansing*, 52:10:450, October 1962.

Discusses the litter problem in the city of London, England. The city spends an average of £3,790 to sweep each mile of street for a year. But sweeping is only a cure, not a preventive measure. Some authorities believe more and better litter containers, advertising campaigns, and the enforcement of antilitter laws through fines is the answer to the problem. The author contends that, in addition to these measures, manufacturers should be made litter conscious. Manufacturers should reduce the amount of packaging of products, thereby putting less litter into the hands of the public. [Gen. 1½ pp.]

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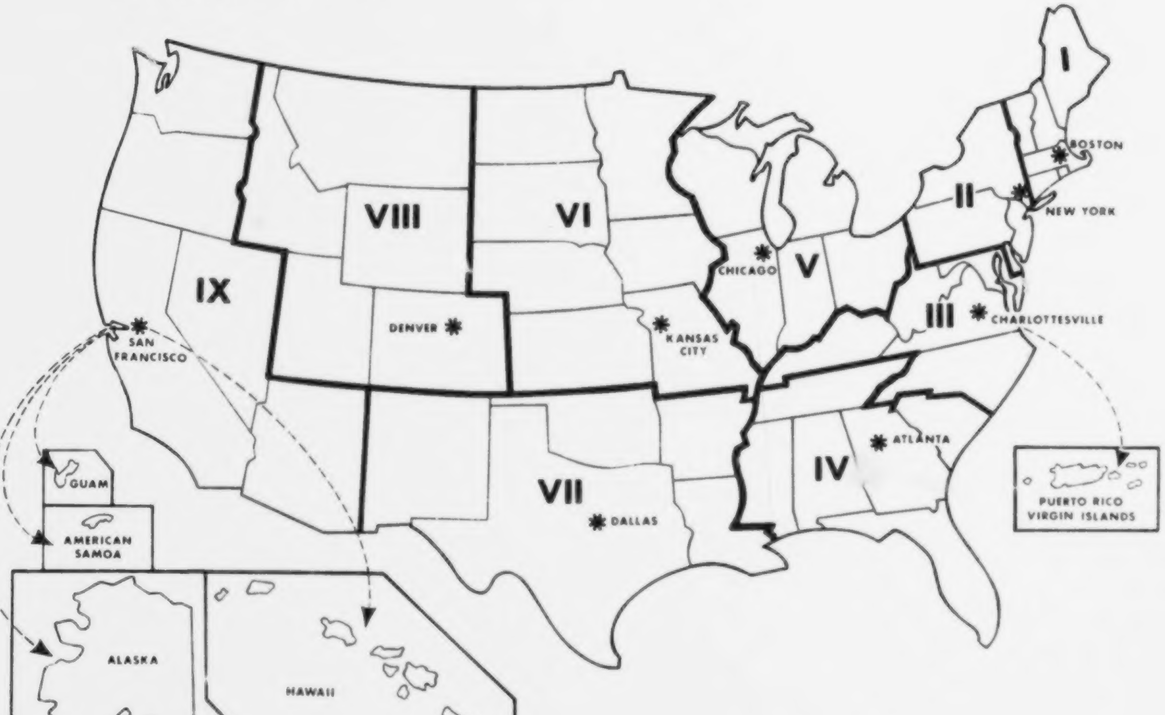
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